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OPERATIONAL USE OF UH-1H HELICOPTERS IN SOUTHEAST ASIA

Raymond B. Johnson, Jr., et al

Technology, Incorporated

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By

Raymond B. Johnson, Jr.
Larry E. Clay
Ruth E. Meyers

May 1973

EUSTIS DIRECTORATE
U. S. ARMY AIR MOBILITY RESEARCH AND DEVELOPMENT LABORATORY
FORT EUSTIS, VIRGINIA

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TECHNOLOGY INCORPORATED
DAYTON, OHIO

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From operational usage parameter measurements on three UH-1H helicopters, 203 hours of valid multichannel flight data were recorded while the helicopters operated from bases in Southeast Asia. Data were processed and analyzed according to four flight phases, called mission segments: (1) ascent, (2) maneuver, (3) descent, and (4) steady state. Data are presented in the form of time and occurrence tables, cumulative frequency distribution curves, and exceedance curves. These data indicate the time spent in the mission segments and parameter ranges; the number of peak parameter values occurring in the ranges of the given parameter during each of the mission segments, and in the ranges of one or more related parameters; and the time to reach or exceed given maneuver or gust normal load factors. The data presented were recorded between September 1971 and March 1972.

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DEPARTMENT OF THE ARMY
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EUSTIS DIRECTORATE
FORT EUSTIS, VIRGINIA 23604

This report has been reviewed by the Eustis Directorate, U.S. Army Air Mobility Research and Development Laboratory and is considered to be technically sound.

The data presented were obtained from oscillograph recorders installed on three U.S. Army UH-1H helicopters performing operational missions in Southeast Asia. Figures and tabulations are used to present these data in the form of time and occurrence tables, cumulative frequency distribution curves, and exceedance curves. Finally, the UH-1H is compared, according to certain parameters of commonality, to similar data previously reported for both the AH-1G and CH-54A helicopters operating in Southeast Asia.

This report is published to define the combat use of the UH-1H and to present the data as an aid in the development of future aircraft.

The technical monitor for this contract was Mr. William T. Alexander Jr., Technology Applications Division.

Task 1F162208AA8203
Contract DAAJ02-71-C-0039
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Final Report

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ABSTRACT

From operational usage parameter measurements on three UH-1H helicopters, 203 hours of valid multichannel flight data were recorded while the helicopters operated from bases in Southeast Asia. Data were processed and analyzed according to four flight phases, called mission segments: (1) ascent, (2) maneuver, (3) descent, and (4) steady state. Data are presented in the form of time and occurrence tables, cumulative frequency distribution curves, and exceedance curves. These data indicate the time spent in the mission segments and parameter ranges; the number of peak parameter values occurring in the ranges of the given parameter during each of the mission segments, and in the ranges of one or more related parameters; and the time to reach or exceed given maneuver or gust normal load factors. The data presented were recorded between September 1971 and March 1972.

FOREWORD

Technology Incorporated, Dayton, Ohio, prepared this report to cover its efforts on an operational usage data program to collect, process, and analyze a 200-hour sample of flight data obtained from three UH-1H helicopters operating in Southeast Asia. This program was sponsored by the Eustis Directorate, U.S. Army Air Mobility Research and Development Laboratory, Fort Eustis, Virginia, under Contract DAAJ02-71-C-0039, DA Task 1F162208AA8203. The project monitor for the Army was Mr. William Alexander.

Of the 203 hours of data that were processed, 37 hours were read and digitized by U. S. Army personnel at Fort Eustis, Virginia, under the direction of Mr. Louis R. Bartek. The remainder of the data were read and digitized by Technology Incorporated. All final data processing, analysis, and documentation were performed by Technology Incorporated.

Technology Incorporated personnel responsible for this program were Mr. Joseph F. Braun, manager of the Systems and Electronics Department; Mr. Henry C. Pender, project manager, who directed the installation and operation of the data recording systems; Messrs. John F. Nash and William D. Harber, who directed the data processing; and Mr. Raymond B. Johnson, Jr., who directed the data analysis and presentation.

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INTRODUCTION

For the continued study of Army helicopter operations, a multichannel operational usage data program was conducted on three UH-1H helicopters flying combat missions in the Vietnam theater from September 1971 to March 1972. During this period, 203 hours of valid in-flight data were recorded and processed for each of 11 time-related parameters. The parameters were selected to reflect the operational usage of the helicopter.

The UH-1H is an all-metal, single-engine helicopter. A single, two-bladed, semirigid teetering main rotor provides lift, and a two-bladed, semirigid, delta-hinged tail rotor provides antitorque and directional control. Figure 1 presents a photograph and a summary of characteristics and limitations of the UH-1H helicopter.

An oscillograph type of recording system was used to measure the following 11 in-flight parameters: airspeed; altitude; vertical, lateral, and longitudinal acceleration at the helicopter's center of gravity; outside air temperature; main rotor speed; engine torque; and longitudinal cyclic boost tube, lateral cyclic boost tube, and collective boost tube loads--all related in time. Field personnel logged additional information to permit the computer processing of the in-flight recordings. Such supplementary data consisted of time, fuel, and load at takeoff and loading; base pressure and temperature at takeoff; and mission type. The data processing derived additional parameters: specifically, the instantaneous weight, the rotor tip speed ratio, and the ratio of the thrust coefficient to the rotor solidity. As in previous programs, the data for each flight were divided into four mission segments: (1) ascent, (2) maneuver, (3) descent, and (4) steady state.

The objective of the program was to present comprehensive operational usage data based on the UH-1H's operation in the combat environment of Vietnam, and to analyze these data in an effort to improve the fatigue analyst's understanding of the operational flight spectrum of U. S. Army helicopters and its effect in defining reliable design criteria for helicopters.

This report describes the aircraft instrumentation and the recording system, details the data collection, defines the recorded and derived parameters, outlines the data processing and quality control, explains the data computations, and finally presents and analyzes the processed data. The results are presented as cumulative frequency distribution

curves of the percentage of time within various parameter ranges; as "exceedance" curves, that is, curves of the number of flight hours required for a parameter to reach or exceed given levels or curves of the cumulative number of occurrences of the parameter at a given level per thousand hours of flight; as tables of time distributed among coincident ranges of two or more parameters; and as tables of peak frequencies in the coincident ranges of the peaking parameter and other variables.

Characteristics	
rotor diameter	48 ft
rotor solidity	0.0464
engine Lycoming	T-53-L-13
design max gross wt	9500 lb
empty weight (avg)	4920 lb

Limitations	
normal rated power	1250 hp
military rated power	1400 hp
usable power (transmission limit)	1100 hp
100% rotor speed	324 rpm
max airspeed	120 kn

Figure 1. UH-1H Helicopter.

INSTRUMENTATION

To obtain the required operational usage data, oscillographic recording systems were installed in three UH-1H helicopters assigned to the 162nd Assault Helicopter Company (AHC) operating in the delta area of South Vietnam. Identified by serial numbers 70-15816, 69-15427, and 69-15432, these aircraft participated in the program from September 1971 until January 1972, when all three of the aircraft were transferred to the Vietnamese Air Force. As the 162nd AHC was scheduled to be deactivated, the recording systems were installed in three helicopters assigned to the 18th Aviation Company, which was located at the same data acquisition site. These three aircraft, serial numbers 70-15714, 70-15836, and 69-16699, were used until the data acquisition phase was terminated in the latter part of March 1972.

DESCRIPTION OF RECORDING SYSTEM COMPONENTS

Three Century Model 409B recorders, each with 14 data channels and capable of recording numerous dynamic parameters on 3-5/8-inch-wide photosensitive paper, were used in this program because of their inherent design to withstand severe shock and vibration and extreme environmental conditions. In this program, 11 channels were used to record the in-flight variables. Of the remaining three channels, one was used to monitor the voltage supply, another was used to delineate a time pattern reflecting a 1-minute cycling, and the last was used to trace a static line for measurement reference.

A Technology Incorporated Model 49776 signal conditioning unit was used to regulate the voltage signals from the various transducers.

To derive airspeed, a Statham Model PM96TC-.5-350 (0 to 0.5 psid) pressure transducer was used to measure the dynamic pressure. To derive altitude, a Statham Model P96-15A-350 (0 to 15 psia) pressure transducer was used to measure the ambient static pressure.

For the three linear acceleration measurements, a Statham Model A3-5-350 (±5g) accelerometer was used to sense vertical acceleration, and two Statham Model A3-1.5-350 (±1.5g) accelerometers were used to sense lateral acceleration and longitudinal acceleration.

A frequency-to-voltage converter and associated circuitry were incorporated in the recording system to measure the rotor speed by sensing the frequency of the rotor tachometer generator.

A Minco Model S-6B resistance thermal ribbon was used to measure the outside air temperature.

To measure the engine torque pressure, a Viatron Model PTB103 (0 to 100 psig) pressure transducer was connected in parallel with the helicopter's torque pressure transmitter.

Micro-Measurements Corporation Model EA-13-250BF-350 strain gages were installed on the longitudinal cyclic, lateral cyclic, and collective boost tubes for measurement of control stick strains. Two sets of gages were mounted side-by-side on each boost tube, and each set was wired into a Wheatstone bridge with two active arms and two inactive arms for temperature compensation. One set of gages was designated as "primary" and the other as a "spare." After their installation on the boost tubes, both the primary and the spare bridges were calibrated to provide a relationship between the bridge output in volts and the boost tube axial load in pounds.

The block diagram in Figure 2 illustrates the functional integration of the components making up the recording system.

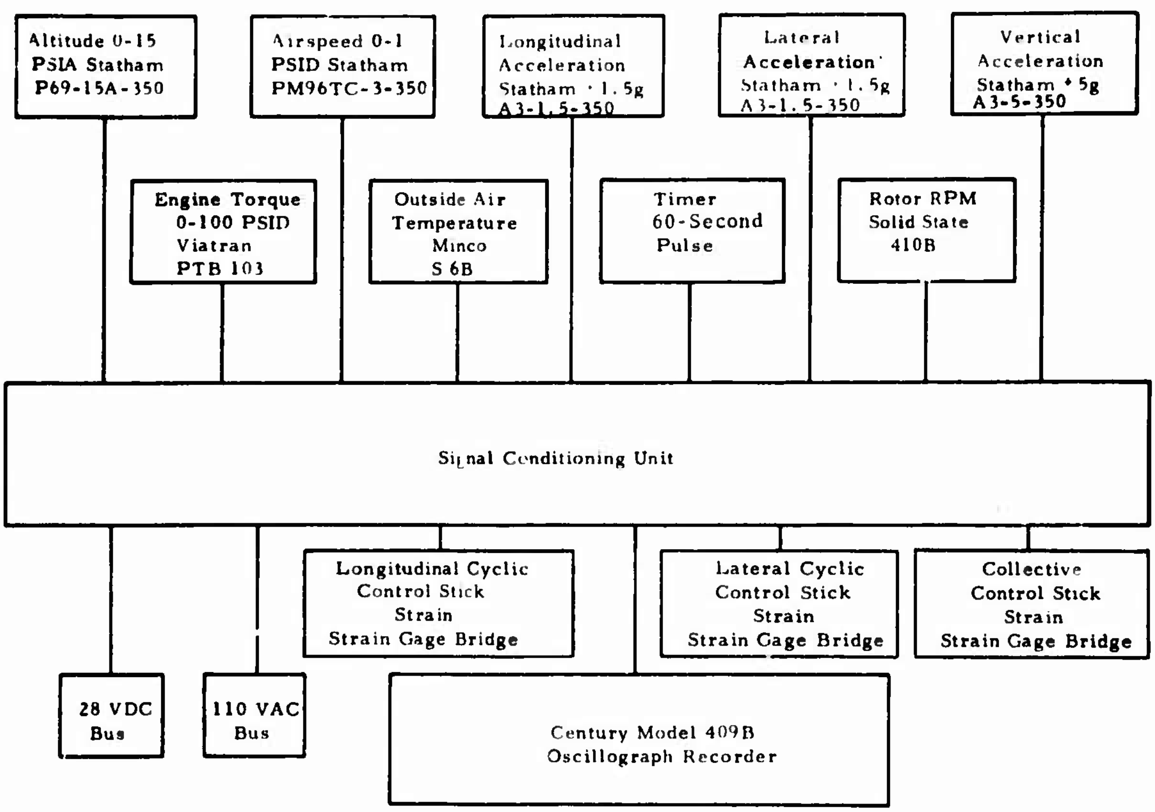


Figure 2. Block Diagram of UH-1H Instrumentation System.

INSTALLATION OF RECORDING SYSTEM

The recorder and signal conditioning unit were mounted in the left-side baggage compartment. The torque transducer was mounted on the forward right-side firewall, with high-pressure hoses connecting the unit in parallel with the existing aircraft torque transmitter. The three accelerometers were attached to the transmission housing on the left side at the approximate aircraft center of gravity. The airspeed and altitude transducers were placed in the nose compartment and connected to the aircraft's pitot and static system behind the control panel. The rotor speed hookup was also made behind the control panel at a terminal strip. The OAT ribbons were attached to the outer skin just to the left of the aft searchlight. A circuit breaker was installed in the overhead circuit breaker panel and connected to the DC bus to provide 28-watt DC power. The 110-volt-AC, 400-Hz power was acquired from the AC circuit-breaker panel on the right side of the center console. An in-line fuse holder was connected to the AC bus for circuit protection.

The cabling was routed with existing aircraft cabling through the bottom of the baggage compartment, into the aft hydraulic compartment, through the area beneath the engine platform, and into the sling load hook area. From this area the cables divided: the OAT, altitude, airspeed, and rotor speed cables were directed forward under the cargo floor to the nose compartment; the rest were routed upward along the left side of the transmission area, where all but the torque and power lines were terminated. The torque cable was routed aft from the transmission into the engine compartment and across the front of the engine to the transducer. The power wires were routed from the top of the transmission into the cabin overhead area and forward to the respective circuit-breaker panels.

The field team assisted U.S. Army personnel in removing the existing control tubes and installing the instrumented units in the aircraft. Figure 3 is an outline drawing of the UH-1H helicopter showing the recording system component locations.

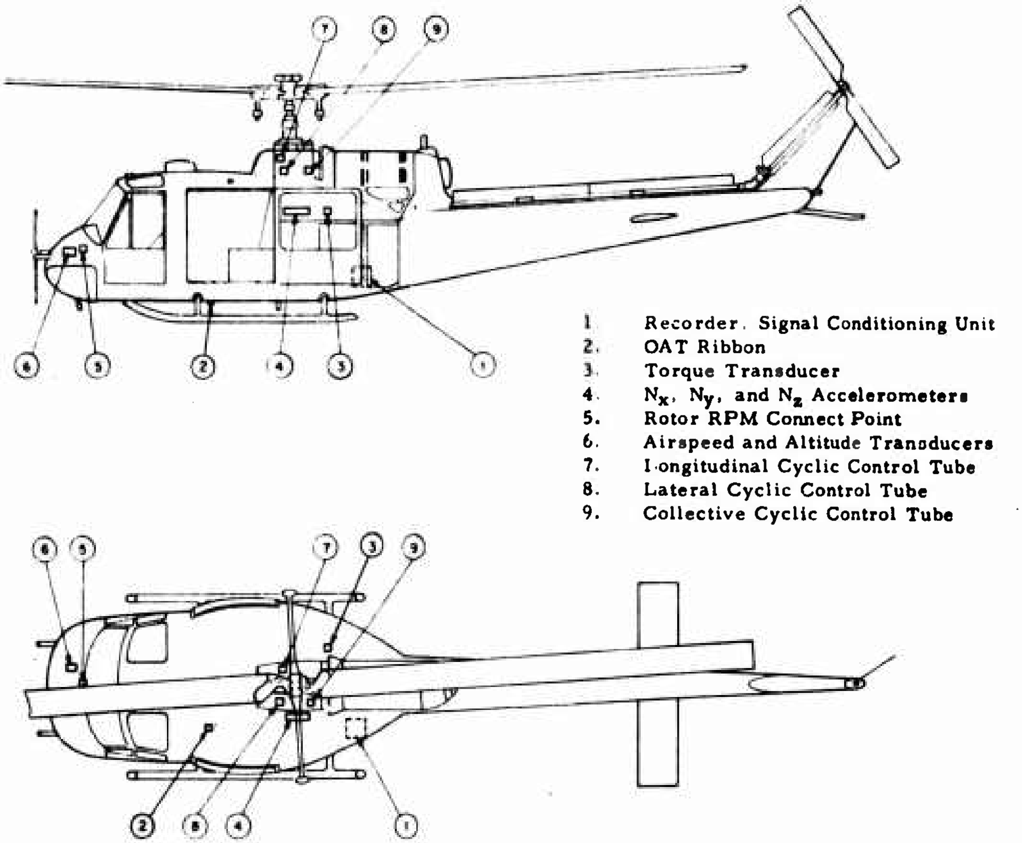


Figure 3. Multiview Drawing of UH-1H Helicopter With Instrumentation Locations.

UH-1H DATA COLLECTION

During the data collection period from 9 September 1971 to 31 March 1972, 457 hours of in-flight data were recorded. Of these hours, 232 were usable and 203 were processed. As presented in this report, the processed data represent 229 engine starts and 792 touchdowns. Some of the factors limiting the hours of usable data were erratic or insufficient trace deflection, malfunction of the oscillogram drive motor, and no supplemental flight data. Upon developing the oscillograms and observing trace anomalies, the field technician was aware of the cause of most of them and took remedial action as soon as possible.

After each recorded flight, the field technician filled out a special form to log the supplemental data needed to process the oscillogram data. Such additional information included the flight date; mission type; airspeed and rotor speed at check points; elevation, barometric pressure, and temperature at takeoff; and base, time, fuel weight, and passenger and cargo weight for both takeoff and landing. In addition, the field technician logged the serial number for each transducer so that the calibration data could be correlated with the recorded data during the final data processing.

DATA DEFINITIONS

RECORDED PARAMETERS

The 11 in-flight parameters recorded on the oscillograms consisted of (1) altitude, (2) airspeed, (3) outside air temperature, (4) c.g. vertical acceleration, (5) c.g. lateral acceleration, (6) c.g. longitudinal acceleration, (7) rotor speed, (8) engine torque, (9) longitudinal cyclic boost tube load, (10) lateral cyclic boost tube load, and (11) collective boost tube load. For each of these parameters and the computed parameters presented below, Table I lists the ranges selected for the data blocks.

COMPUTED PARAMETERS

From the fuel, cargo, and passenger weights at takeoff and landing, as logged on the supplemental data sheets, the gross weight was computed for the start and end of each mission. A constant rate of fuel consumption was assumed to obtain the average weight-loss rate that was used to compute the instantaneous gross weight. Weight gains or losses because of cargo or passenger changes were introduced at the times noted on the supplemental data sheets.

For each data reading point, three derived parameters were added: (1) the rotor tip speed ratio, (2) the ratio of the thrust coefficient to the rotor solidity, and (3) the density altitude.

The rotor tip speed ratio, μ, was computed by the following equation:

$$\mu = \frac{V}{\Omega R} \tag{1}$$

where V = airspeed, ft/sec
Ω = rotor angular velocity, rad/sec
R = rotor radius, 24.0 ft

The following equation was used in computing the ratio of thrust coefficient to the rotor solidity, that is, C_T/σ:

$$C_T/\sigma = \frac{W}{\rho\pi^2(\Omega R)^2\sigma} \tag{2}$$

where C_T = thrust coefficient
W = gross weight (instantaneous), lb
ρ = air density at altitude, slugs/ft^3
σ = rotor solidity = 0.0464

TABLE I. PARAMETER RANGES

Recorded Parameters

n_x and n_y (g)	Airspeed (kn)	Longitudinal, Lateral, and Collective Stick Boost Tube Load (lb)	n_z (g)	OAT (°F)
<-0.40	<40	<-450	<0.2	<0
-0.40 to -0.35	40 to 60	-450 to -400	0.2 to 0.4	0 to 10
-0.35 to -0.30	60 to 65	-400 to -350	0.4 to 0.5	10 to 20
-0.30 to -0.25	65 to 70	-350 to -300	0.5 to 0.6	20 to 30
-0.25 to -0.20	70 to 75	-300 to -250	0.6 to 0.7	30 to 40
-0.20 to -0.15	75 to 80	-250 to -200	0.7 to 0.8	40 to 50
-0.15 to -0.10	80 to 85	-200 to -150	0.8 to 1.2	50 to 60
-0.10 to 0.10	85 to 90	-150 to -100	1.2 to 1.3	60 to 70
0.10 to 0.15	90 to 95	-100 to 100	1.3 to 1.4	70 to 80
0.15 to 0.20	95 to 100	100 to 150	1.4 to 1.5	80 to 90
0.20 to 0.25	100 to 105	150 to 200	1.5 to 1.6	>90
0.25 to 0.30	105 to 110	200 to 250	1.6 to 1.7	
0.30 to 0.35	110 to 115	250 to 300	1.7 to 1.8	
0.35 to 0.40	115 to 120	300 to 350	1.8 to 2.0	
>0.40	>120	350 to 400	2.0 to 2.2	
		400 to 450	2.2 to 2.4	
		>450	>2.4	

RPM
<294
294 to 314
314 to 324
324 to 330
330 to 339
>339

Computed Parameters

n_{z_e} (g)	Climb Rate (ft/min)	Rotor Tip Speed Ratio (μ)	Gross Weight (lb)	Torque (psi)
<0.2	<-2100	<0.05	<6000	<10
0.2 to 0.4	-2100 to -1800	0.05 to 0.10	6000 to 7000	10 to 20
0.4 to 0.5	-1800 to -1500	0.10 to 0.15	7000 to 8000	20 to 30
0.5 to 0.6	-1500 to -1200	0.15 to 0.20	8000 to 9500	30 to 40
0.6 to 0.7	-1200 to -900	0.20 to 0.25	>9500	40 to 50
0.7 to 0.8	-900 to -600	0.25 to 0.30		50 to 60
0.8 to 1.2	-600 to -300	>0.30		60 to 70
1.2 to 1.3	-300 to 300			>70
1.3 to 1.4	300 to 600			
1.4 to 1.5	600 to 900			
1.5 to 1.6	900 to 1200			
1.6 to 1.8	1200 to 1500			
1.8 to 2.0	1500 to 1800			
2.0 to 2.2	1800 to 2100			
2.2 to 2.4	>2100			
2.4 to 2.6				
>2.6				

Thrust Coef./Rotor Solidity (C_T/σ)	Density Altitude (ft)
<0.06	<1000
0.06 to 0.09	1000 to 2000
0.09 to 0.12	2000 to 5000
0.12 to 0.15	5000 to 10000
>0.15	10000 to 15000
	>15000

The following equation (Reference 1) was used to compute density altitude, h_d, since this parameter is normally used in describing helicopter performance:

$$h_d = 145{,}300 \left[1 - \left(\frac{518.4\ P_a}{29.92(OAT + 460)} \right)^{0.235} \right] \tag{3}$$

where P_a = static pressure, inches of mercury
OAT = outside air temperature, °F

Each peak of c.g. vertical acceleration, a_z, was measured directly from the oscillogram trace. To present normal load factor, n_z, and incremental normal load factor, Δn_z, the following relationships were used:

$$\Delta n_z = \frac{a_z}{g} \tag{4}$$

$$n_z = \Delta n_z + 1.0 \tag{5}$$

For each of the normal load factor peaks, the equivalent normal load factor, n_{z_e}, was computed according to the relation

$$n_{z_e} = n_z \frac{W_i}{W_D} \tag{6}$$

where n_z = normal load factor peak
W_i = instantaneous weight at time of acceleration peak
W_D = design gross weight, 6600 lb

Since the pitot-static position error was judged to be negligible in the range of interest, only indicated airspeeds were considered. Rotor speed and outside air temperature were computed by applying the calibrations to the trace measurements. The measured trace displacements for the boost tube loads were converted to pounds of force. Based on the average slope of pressure altitude derived from the static pressure trace, the rate of climb was computed continuously during each segment. Engine torque was calibrated in units of psi as taken from the cockpit indicator.

MISSION SEGMENTS

For a more meaningful analysis of helicopter performance and loads, the data for each flight were separated into four mission segments: (1) ascent, (2) maneuver, (3) descent, and (4) steady state. The first three segments are the transient,

or unsteady, regimes of flight and were distinguished from the steady-state segment by the variations in the stick boost tube load, airspeed, and altitude traces. The segments were identified and defined as follows: ascent included both the takeoff and climb to the initial cruise altitude and all other unsteady ascents to other altitudes; maneuver included flight sections where ascents and descents were too short to be classified as such and were characterized by activity in the airspeed, altitude, and stick boost tube traces; descent included the unsteady part of flare and landing and all other unsteady descents; and steady state included cruise, hover, steady ascent (after the initial climb), and steady descent. Flare and landing initiated from hover was included in steady state. Such steady-state sections were identified by minimal fluctuation of the stick boost tube traces about mean values and the constancy or smooth change of the airspeed and altitude traces.

DATA PROCESSING

DATA EDITING

Each oscillogram was examined by the data processing editors for evidence of any instrumentation anomaly such as a missing trace and improper sensitivity. Any flight whose data was judged invalid and therefore unacceptable because of recorder malfunctioning evidence was not processed. The editors then timed all acceptable flights and identified the bounds for the four mission segments in each flight.

After demarcating the flights into mission segments, the editors marked the traces to govern the data reading. The vertical acceleration trace was marked wherever a peak met the following two conditions: (1) the peak fell outside prescribed threshold levels (±0.2g about the 1.0g mean), and (2) the peak had a rise and a fall (or fall and rise) that were each 50 percent of the primary peak value or 0.2g, whichever was greater. Although the prescribed thresholds were 0.8 and 1.2g, the editors used levels of 0.84 and 1.16g to ensure the inclusion of all valid peaks. However, any of the peaks read within the fixed threshold levels of 0.8 and 1.2g were eliminated during the processing. In addition, the editors identified each peak as being maneuver- or gust-induced. To determine whether a peak was induced by a maneuver or a gust, the editors noted the behavior of the n_z and airspeed traces. An n_z peak was coded as being gust-induced if the airspeed trace had a jagged pattern and the n_z peak had a short duration and an exponential decay. All other peaks were coded as maneuvers.

The editors marked primary peaks on the lateral and longitudinal acceleration traces wherever they deflected outside the prescribed threshold of ±0.1g. These peaks were not identified as being maneuver- or gust-induced. As before, to ensure the inclusion of all valid peaks, the editors used levels of ±0.097g instead of 0.1g. Again, however, any peaks read within the prescribed threshold of ±0.1g were eliminated during the computer processing.

In editing the three control stick boost tube load traces, the editors marked (1) those peaks that fell outside the threshold of ±100 pounds and (2) those peaks that had a rise and a fall that were each 50 percent of the primary peak value or 100 pounds, whichever was greater. The normal value used was dependent on the mission segment: for the steady-state mission segment, the normal used was the steady value of the boost tube traces just before and after the peak

load was encountered. For the three transient mission segments, an arbitrary set of normal values was chosen to approximate the boost tube loads during hover. The selected values are listed by aircraft serial number in Table II.

TABLE II. CONTROL STICK BOOST TUBE NORMAL LOADS USED DURING TRANSIENT MISSION SEGMENTS

Aircraft Serial No.	Lateral Cyclic (lb)	Longitudinal Cyclic (lb)	Collective (lb)
70-15714	-60	10	-50
70-15816	-40	-10	-50
69-15432	-95	-5	-50

At peaks of c.g. normal load factor, n_z, the values of n_z, c.g. longitudinal load factor, n_x, and c.g. lateral load factor, n_y, were read. At the peaks of n_x, the values of n_x, n_y, n_z, and cyclic longitudinal stick boost tube were read. At the peaks of n_y, the values of n_x, n_y, n_z, and the lateral cyclic boost tube were read. The traces for the other parameters--airspeed, altitude, rotor speed, torque, and outside air temperature--were marked for measurement at sufficient points to permit an adequate representation of the flight profile.

The peak values of the three linear accelerations were measured from the normal (static) positions of the respective traces. For n_x, n_y, and n_z, the normal positions were defined when the helicopter was in a cruise condition. The positive sense of n_x is acceleration forward, and the positive sense of n_y is acceleration to the right.

DATA READING AND QUALITY CONTROL

All data points selected during the editing were measured on semiautomatic oscillogram readers which transcribed the measurements directly onto punched cards. When all data were extracted from a flight, a printout of the cards was given to the quality control personnel for preliminary data checking. Using standard quality control techniques, these personnel manually remeasured points constituting an adequate random sample and compared the measurements with those produced on the semiautomatic readers. The differences obtained between

the two sets of readings were used to establish the mean and standard deviations as a control of the desired accuracy. The flights whose measurements did not meet the accuracy standard so established were reread on the semiautomatic readers. In addition to obtaining accurate values, this procedure ensured a uniform interpretation and measurement of the traces. Some of the data processed for this report was edited and read by the U.S. Army Air Mobility Research and Development Laboratory, Fort Eustis, Virginia, and the remainder was edited and read by Technology Incorporated. The procedures followed by both organizations were identical with the exception of the reading increment, which was 100 counts per inch at Fort Eustis and 200 counts per inch at Technology Incorporated.

When all data had been processed, the mean and the standard deviation were calculated for the entire data sample. Assuming a normal distribution of reading errors, 99.7 percent of the readings should be within three standard deviations of the true values. Based on average calibration values and the comparison of the data edited and read by the Army and the contractor, Table III shows the three-standard-deviation variation for each parameter.

TABLE III. DATA READING VARIATIONS BY PARAMETER

	3σ Variation		
Parameter	Contractor's Digitized Data	Army Digitized Data	All Digitized Data
Altitude (at 2000 feet)	± 100 ft	± 150 ft	± 110 ft
Airspeed (at 90 knots)	± 1.5 kn	± 3.0 kn	± 2.0 kn
n_x	± 0.026g	± 0.034g	± 0.028g
n_y	± 0.027g	± 0.04[illegible]g	± 0.030g
n_z	± 0.027g	± 0.0[illegible]	± 0.031g
OAT	± 1.05°F	± 1.65°[illegible]	± 1.18°F
Rotor rpm	± 3.0 rpm	± 5.2 rp[illegible]	± 3.6 rpm
Engine Torque	± 0.5 psi	± 1.0 psi	± 0.6 psi
Collective Boost Tube	±26.1 lb	±51.2 lb	±31.3 lb
Cyclic Lateral Boost Tube	±28.6 lb	±54.3 lb	±33.8 lb
Cyclic Longitudinal Boost Tube	±23.6 lb	±40.5 lb	±27.3 lb

FINAL DATA ACCEPTANCE

As the data for each flight were found acceptable by quality control, the data were processed on the CDC 6600 computer at Wright-Patterson Air Force Base. During the continuing data processing, the printouts of the processed data were compared with the corresponding oscillograms and supplementary data sheets to check extreme values and parameter distributions. If any errors in the data were detected, they were corrected and the entire flight was reprocessed through the computer. After flights were found acceptable following either the initial printout review or subsequent correction, their data were filed on a master tape containing the data from previously accepted flights. This procedure was repeated until all flights were merged on the master tape. When completed, this tape was used to generate the various tables presented in this report.

DATA PRESENTATION AND ANALYSIS

INTRODUCTION

As part of the continuing effort to improve the fatigue analyst's understanding of the operational flight spectrum of U.S. Army helicopters and to develop an improved definition of operational usage as it affects design criteria, the data gathered on the UH-1H helicopters flying various missions in SEA are analyzed and discussed in the following paragraphs. This analysis and presentation follows the procedure and format established in Reference 2. In general, these data are compared with the flight spectra for the AH-1G and CH-54A helicopters flying in SEA; with the flight spectrum data obtained for similar types of helicopters; with empirical fatigue spectra initially used to establish preliminary component service lives; and with the empirical spectrum defined in the Civil Aeronautics Manual 6, Appendix A. The analysis will be divided into ten sections: mission segments, airspeed, rotor speed, gross weight, engine torque, altitude, rate of climb, normal load factor, equivalent normal load factor, and control boost tube load.

The data presented in this report consist of two types of figures and two types of tables. The two graphical presentations are cumulative frequency distribution curves of various parameters such as airspeed, rotor speed, and engine torque, and exceedance curves of the time to reach or exceed given levels of the parameter or of the cumulative occurrences per 1000 hours at or below given levels of such parameters as Δn_z, rate of climb, and boost tube load. The two tabular formats are flight time distributed among the coincident ranges of two or more parameters, and frequency of acceleration peaks and incremental boost tube load peaks distributed among the coincident ranges of other variables. All times shown were rounded to the nearest tenth of a minute. Since in each subtable the total under the time column was computed and then rounded, a total may not agree with the sum of the rounded times in each line. Times between 0 and 0.05 minute were printed as ".0", and times equal to zero were printed as "0.0". Tables having neither points nor time were not printed. Table headings are arranged so that the first-mentioned variable refers to the horizontal ranges at the top of the table and the second-mentioned variable refers to the vertical ranges at the left of the table. Where a third or a fourth variable is given, it is followed by its range in the heading. As an example, the heading "MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000 BY MISSION SEG. ASCENT" indicates the time spent in coincident ranges of altitude and airspeed at a weight

between 6000 and 7000 pounds during the ascent mission segment. All printed range values are the lower limits.

In comparing various flight-measured values for the UH-1H, AH-1G, and CH-54A helicopters, the limiting parameter values in Table IV were used.

TABLE IV. HELICOPTER FLIGHT PARAMETER LIMITS

Parameter	UH-1H	AH-1G	CH-54A
Airspeed - V_{ne}	120 kn	190 kn	110 kn
V_h	-	158 kn	-
Rotor Speed (Normal Operating range)	294-324 rpm	314-324 rpm	100% 104%
Engine Torque (Transmission Input Limit)	50 psi	49.1 psi	163%
(Single for AH-1G & UH-1H; Dual for CH-54A)			
Max Design Gross Weight	9500 lb	9500 lb	42,000 lb

MISSION SEGMENTS

On the basis of the mission segments of ascent, maneuver, descent, and steady state defined in the Data Definitions section, the current UH-1H data are compared in Figure 4 with the UH-1H fatigue spectrum, with the CAM-6 data, and with the design fatigue and operational spectra of several other helicopters, namely, the UH-1B, AH-1G, CH-47A, and CH-54A; the data sources used for the latter helicopters are listed in Table V.

TABLE V. SOURCES OF PRESENTED DATA

Helicopter	Fatigue Spectrum	Operational Data
UH-1B	3	4
AH-1G	5	6
CH-47A Armed	7	8
CH-47A Transport	-	9
CH-54A	10	11

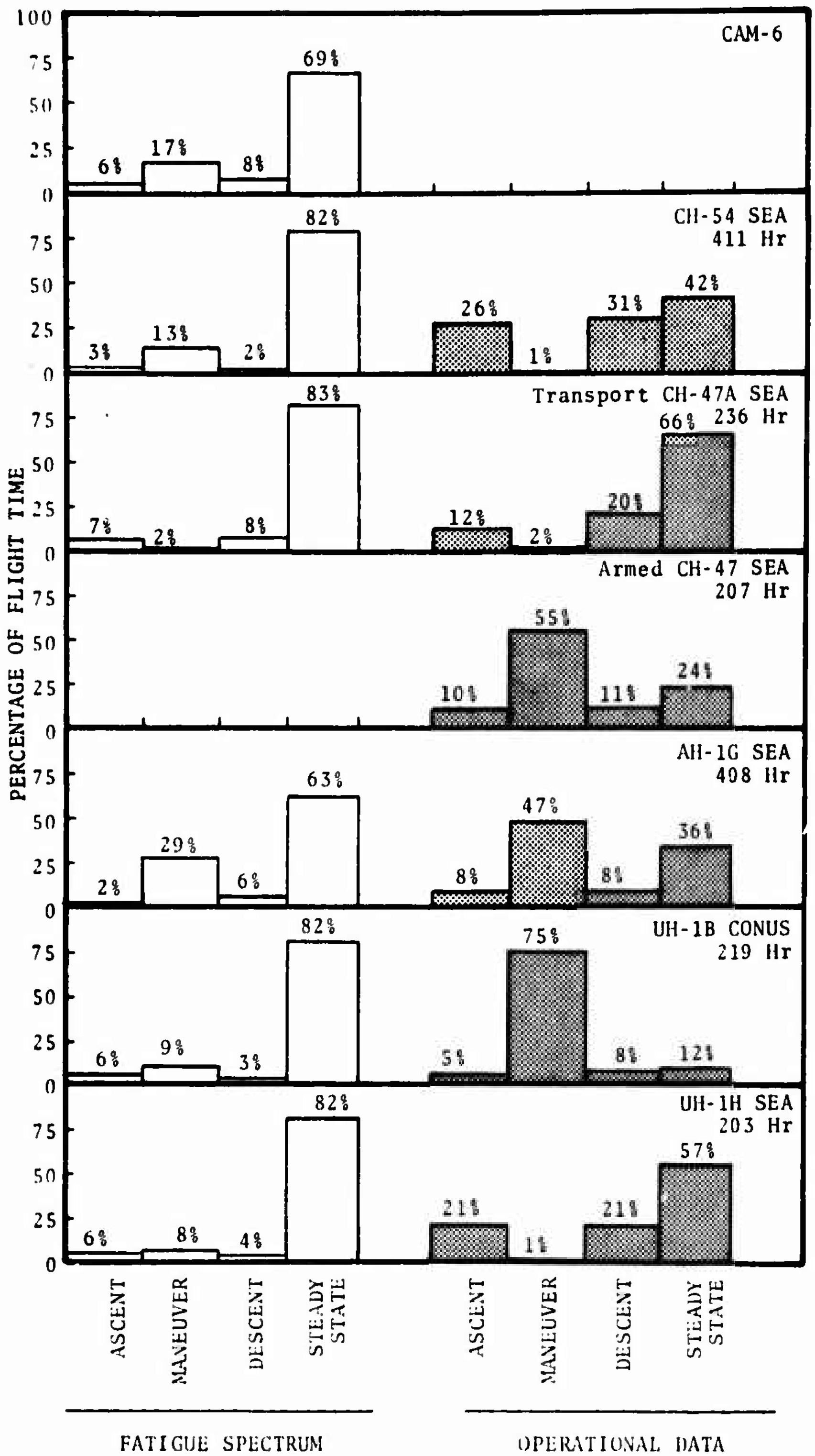


Figure 4. Comparison of Operational Data and Fatigue Spectra for Various Helicopters.

The current UH-1H helicopters spent the following percentage of time in each of the four mission segments: ascent, 21 percent; maneuver, 1 percent; descent, 21 percent; and steady state, 57 percent.

In the comparison of these data with the previously gathered data for other types of helicopters, several unusual relationships appear in Figure 4 for helicopters flying what would be assumed to be diverse missions. First, the UH-1H, CH-47A, and CH-54A helicopters all flew missions which had higher ascent and descent content and lower steady-state and maneuver content. In particular, the maneuver content for these helicopters was lower than those in their design fatigue spectra and was much lower than that for the AH-1G, UH-1B, and armed CH-47A helicopters. Second, it appears that the UH-1B, AH-1G, and armed CH-47A helicopters, operating in SEA or flying a simulated combat mission in the case of the UH-1B, flew a characteristic mission whose maneuver content was much higher than those in either their design fatigue spectra or the UH-1H, CH-47A (CARGO), and CH-54A missions. In Reference 12, the percentage of time in the various mission segments for the OH-6A and AH-1G helicopters did not compare favorably. However, in the context of the data presented in Figure 4, the OH-6A distribution within mission segments is very similar to that for the UH-1B, AH-1G, and armed CH-47A helicopters. Since the OH-6A data follow the same trends as these other helicopters, they were not presented again.

The relationships shown above are supported for the UH-1H helicopter when the types of missions are reviewed. Four basic missions were flown by the current UH-1H helicopters: combat assault, direct combat support, command and control, and passenger transport. Only the first mission can be considered similar to the AH-1G, armed CH-47A, and UH-1B missions since it includes operations in a hostile environment; the other missions are nonhostile operations consisting predominately of resupply and personnel transportation. The percentages for the four mission types in the 249 missions recorded during the current UH-1H program are as follows: combat assault, 16.5 percent; direct combat support, 71.1 percent; command and control, 8.4 percent; and passenger transport, 4.0 percent.

A review of the current UH-1H data and previously gathered data for the helicopters represented in Figure 4 indicates very poor correlation with the design fatigue spectrum obtained from Appendix A of CAM-6, Reference 13. The mission segment distribution of the flight time in the current UH-1H data is 21 percent in ascent, 1 percent in maneuver, 21 percent in descent, and 57 percent in steady state. CAM-6

specifies 6 percent in ascent, 17 percent in maneuver, 8 percent in descent, and 69 percent in steady state. No trend between the UH-1H data and CAM-6 requirements can be discerned. It should be noted that the percentage of time distribution for CAM-6 presented in Figure 4 differs from the breakdown given in Reference 12; the values used in Figure 4 were obtained by the same methods of classification as those used for the reduction of the operational data.

On the basis of the above information, it would appear that the gathered data further demonstrate the individuality of fl:ght spectrum data and the importance of mission assignment in establishing the characteristics of the operational usage spectrum. However, it was also noted above that a general trend does exist for helicopters flying a general type of mission. The operational usage spectrum for component fatigue analysis could be much better approximated by defining a general usage spectrum for either military assault or military nonassault missions than by using any one of the design spectra in Figure 4; each of these proposed spectra is defined in Table VI.

TABLE VI. PERCENTAGE OF TIME BY MISSION SEGMENT FOR GENERAL MILITARY OPERATIONAL SPECTRA

	Time in Segment	
Segment	Military Assault	Military Nonassault
Ascent	8%	25%
Maneuver	60%	5%
Descent	8%	25%
Steady State	24%	45%

Because of the physical similarity of the UH-1H and AH-1G helicopters and the apparent mission similarity of the UH-1H and CH-54A helicopters, the following sections compare the UH-1H data with the AH-1G and CH-54A data.

AIRSPEED

The airspeed frequency distribution for the current UH-1H data is presented in several different formats for analysis purposes. These formats include airspeed comparisons of the UH-1H data with the CAM-6 data, the UH-1H fatigue spectrum, the AH-1G and CH-54A operational flight data, and the

operational flight data for helicopters weighing less than 10,000 pounds. The recorded values of airspeed are presented in terms of "Percent V_{ne} or V_h, whichever is lower." This nomenclature was used instead of "Percent V_A," as in previous reports, to clarify the plotted data. V_A was previously defined as the maximum attainable level-flight airspeed, considering gross weight, usable power, blade stall, and structural limitations. V_{ne} is defined as the "never exceed" airspeed, considering gross weight, blade stall, and structural limitations. V_h is defined as the maximum attainable level-flight airspeed, considering usable power. Since V_{ne} may be less than, equal to, or greater than V_h, the expression "Percent V_{ne} or V_h, whichever is lower" is the same as Percent V_A as previously used in References 2 and 12.

The cumulative airspeed frequency distribution by mission segment for the UH-1H data is presented in Figure 5. This figure indicates that 100 percent of the mission time was spent below 100 percent V_{ne}. Although the UH-1H has enough power to exceed V_{ne} in level flight, it did not do so during this operational survey, probably because of the types of missions flown.

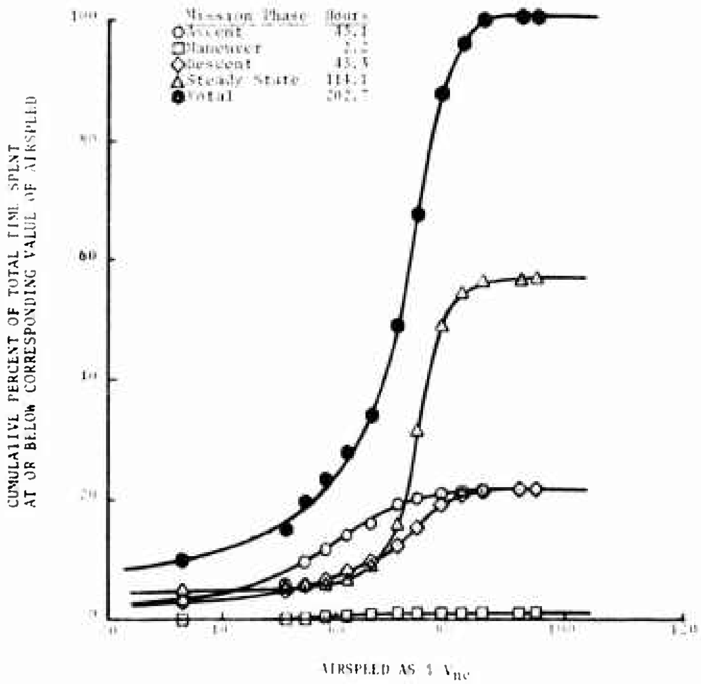


Figure 5. Cumulative Airspeed Frequency Distribution by Mission Segment for the UH-1H.

Figure 6 compares the cumulative airspeed frequency distribution for the UH-1H data with that for the CAM-6 spectrum and the UH-1H design fatigue spectrum. The agreement between these curves is poor. As apparent, the distribution for the

UH-1H data is lower at low airspeed ranges but higher at high airspeed ranges than the distributions for both spectra. If it is assumed that most of the fatigue damage occurs at the higher airspeeds, then the CAM-6 and UH-1H fatigue spectra must be judged conservative since both spectra predict higher percentages of time at these higher airspeed values than were actually recorded.

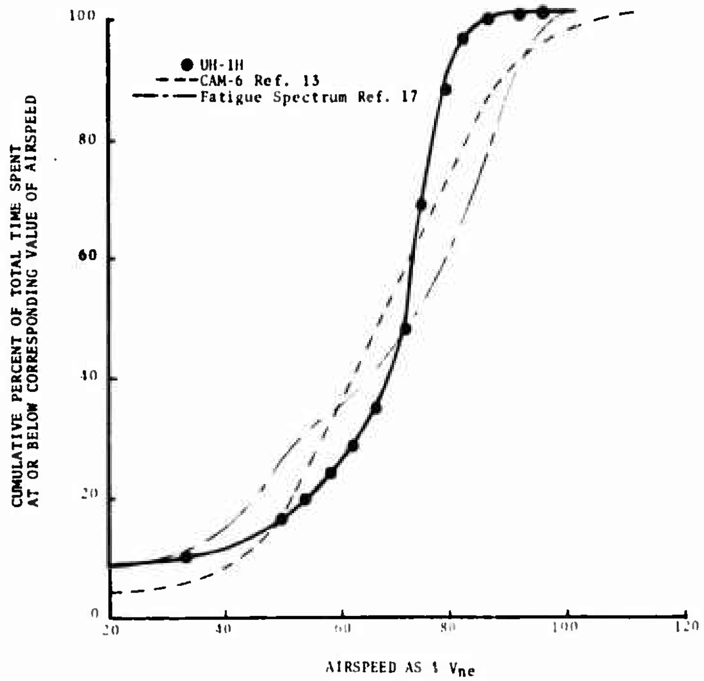


Figure 6. Cumulative Airspeed Frequency Distribution for the UH-1H Compared With CAM-6 and Design Fatigue Spectra.

Figure 7 compares the cumulative airspeed frequency distribution for the UH-1H data with data previously recorded for turbine-powered helicopters having design normal gross weights less than 10,000 pounds. To simplify this comparison, only the $\pm 1\sigma$ scatter band curves obtained by statistical analysis of the Reference 12 and 14 data are shown. These curves include the data for the original curves and the AH-1G and OH-6A data analyzed in Reference 12. In addition, the original $\pm 1\sigma$ scatter band curves, presented in Reference 14, are shown as dashed lines. The UH-1H data are within the scatter band limits, indicating that the UH-1H airspeed data are in good agreement with the airspeed data obtained previously for helicopters in the weight classification below 10,000 pounds.

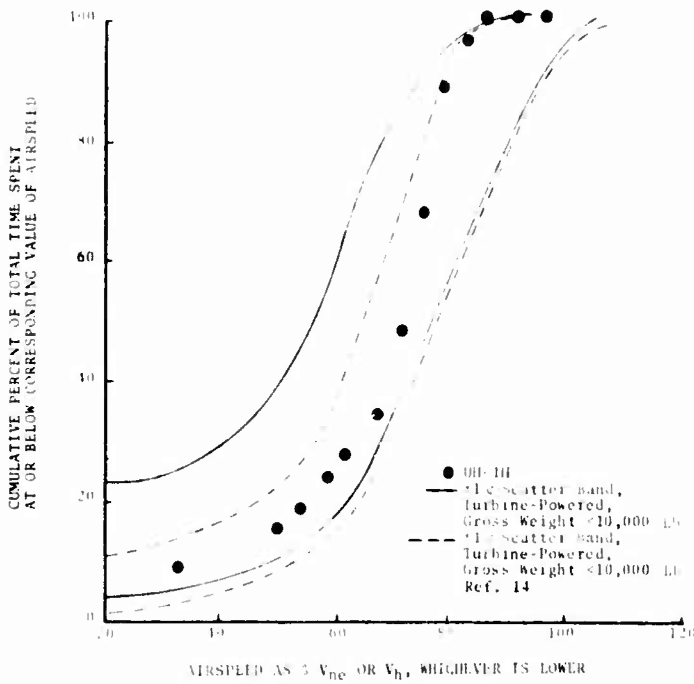


Figure 7. Cumulative Airspeed Frequency Distribution for the UH-1H Compared With Spectra Obtained for Other Turbine-Powered Helicopters With Design Normal Gross Weight <10,000 Lb.

The UH-1H airspeed data are also compared with similar data for the AH-1G and CH-54A helicopters in Figure 8. The UH-1H and CH-54A data compare favorably throughout the airspeed range. The AH-1G curve, however, does not compare as favorably with the UH-1H curve.

The comparison in Figure 9 of the UH-1H data obtained by Technology Incorporated with similar data obtained by Bell Helicopter Company, as reported in Reference 15, shows that Bell Helicopter recorded a larger percentage of data in the range of 55 percent to 75 percent V_{ne}. This larger percentage may be attributed to Bell Helicopter's low 2-per-minute sampling rate or to differences in the types of missions flown. However, since both data samples were taken from helicopters which flew combat support, passenger transport, "ash and trash," and similar types of missions, the difference was likely due to the low data sampling rate.

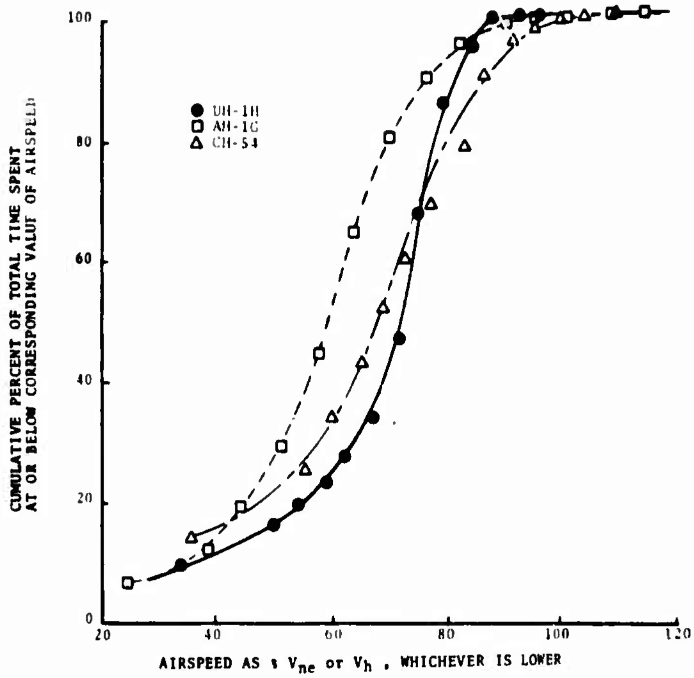


Figure 8. Comparison of Cumulative Airspeed Frequency Distribution for the UH-1H With Similar Data for the AH-1G and CH-54A Helicopters.

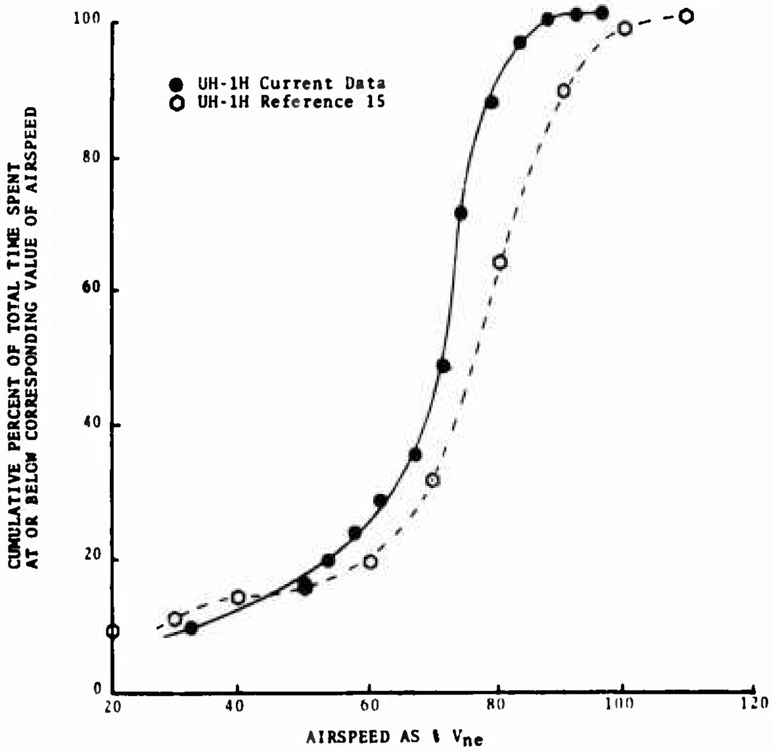


Figure 9. Comparison of Cumulative Airspeed Frequency Distribution for the UH-1H With Similar SEA Data on the UH-1H Obtained by Bell Helicopter Company.

ROTOR SPEED

The cumulative main rotor speed frequency distribution by mission segment for the UH-1H is presented in Figure 10 with respect to the operating rotor speed expressed as a percentage; these data are listed in the Appendix, Table XII. Figure 10 shows that 87, 5, and 8 percent of the recorded flight time were acquired at rotor rpm's between 98 and 102 percent, below 98 percent, and above 102 percent, respectively.

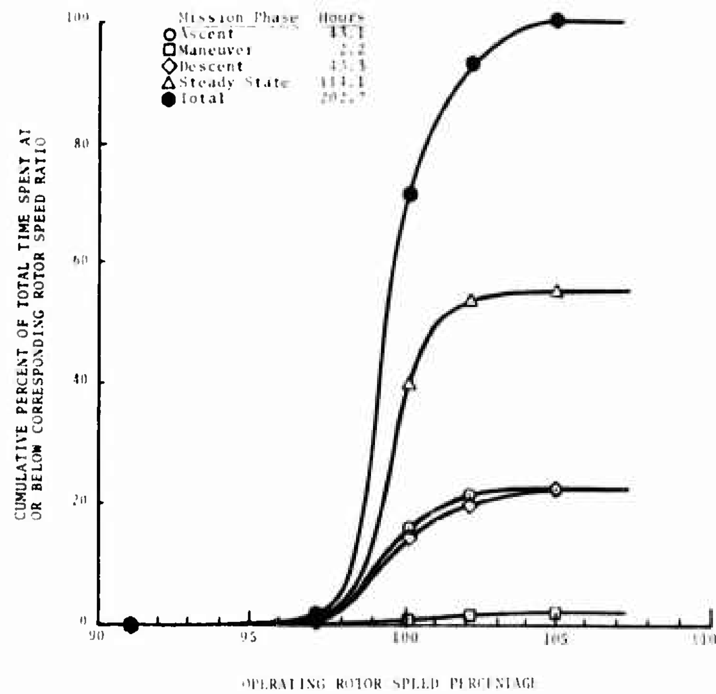


Figure 10. Cumulative Rotor Speed Frequency Distribution by Mission Segment for the UH-1H.

In Figure 11, the cumulative rotor speed frequency distribution for the UH-1H helicopter is compared with similar data for the AH-1G and CH-54A helicopters. The general shapes of the curves for the three helicopters are quite similar, as would be expected. The range of rotor speeds for the UH-1H, AH-1G, and CH-54A was 4 to 6 percent for 95 percent of the total mission time. Figure 11 indicates that the maximum normal rotor rpm limit of 100 percent for the UH-1H and AH-1G and of 104 percent for the CH-54A was exceeded during 28, 2, and 4 percent of their operation, respectively. The large exceedance of the upper limit for the UH-1H may be attributed to the mode of operation and the accuracy of the rotor rpm readings. A system error of 1 percent, or approximately 3 rpm, would change the percentage of operating time above 100 percent N_R from 28 to 13 percent; the 3σ reading

variation discussed in Table III would include the remaining data. It should be noted that changes in the rotor speed measurement system have been made by Technology Incorporated to decrease any possible system error and to decrease the reading error range on future recording programs.

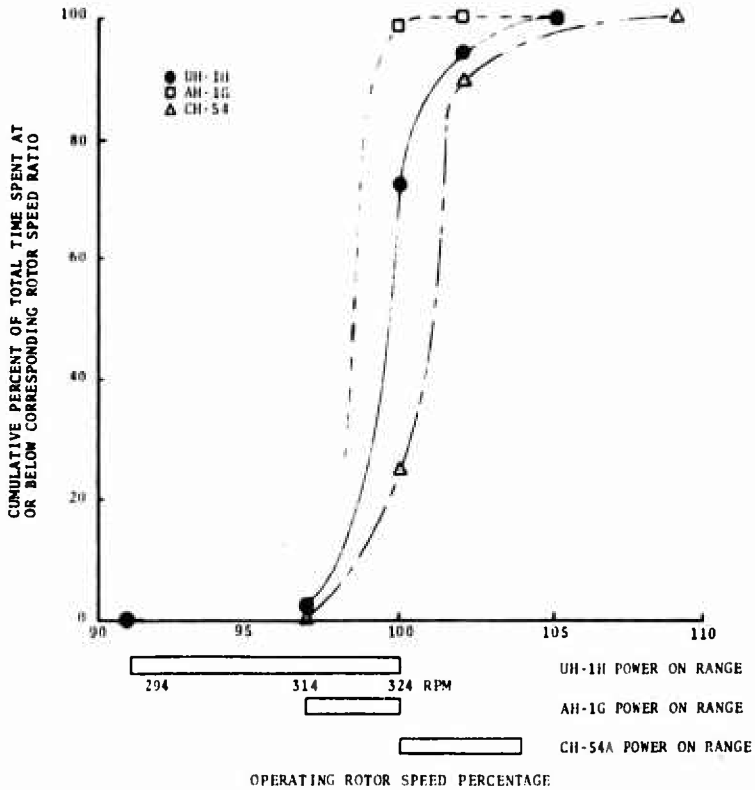


Figure 11. Comparison of Cumulative Rotor Speed Frequency Distribution for the UH-1H With Similar Data for the AH-1G and CH-54A Helicopters.

The comparison in Figure 12 of the UH-1H data obtained by Technology Incorporated with the data obtained by Bell Helicopter Company, as reported in Reference 15, shows that 93 percent of the Bell data but only 72 percent of the Technology Incorporated data were taken at 100 percent rotor speed or below. This large difference may be attributed to two factors: the recording system accuracy of both systems and the low sampling rate of the Bell data.

GROSS WEIGHT

The cumulative gross weight frequency distribution by mission segment for the UH-1H is presented with respect to the ratio of operating gross weight to maximum design gross weight in Figure 13; these data are listed in the Appendix, Table VII.

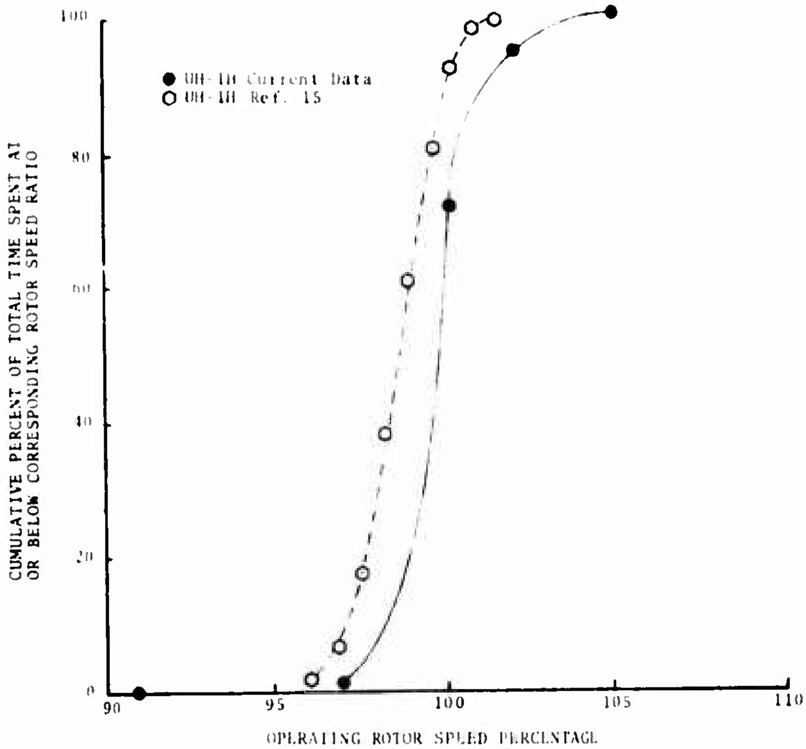


Figure 12. Comparison of Cumulative Rotor Speed Frequency Distribution for the UH-1H With Similar SEA Data on the UH-1H Obtained by Bell Helicopter Company.

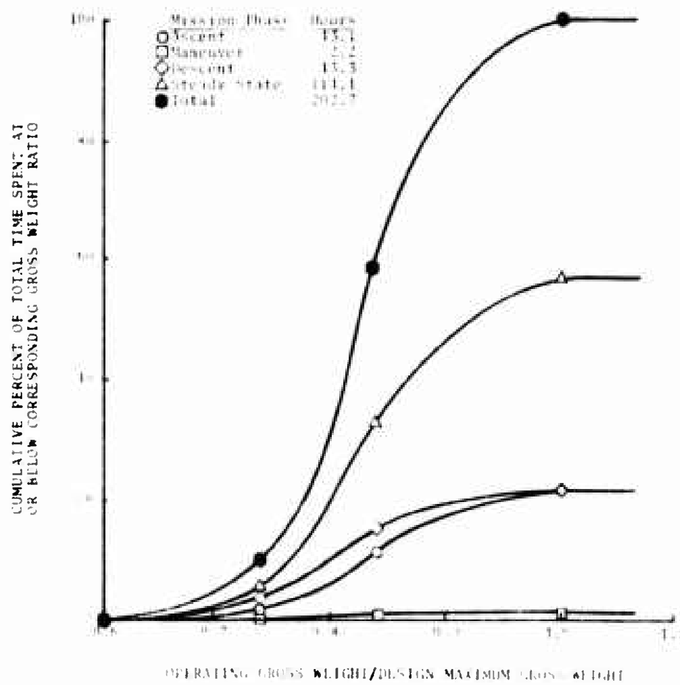


Figure 13. Cumulative Gross Weight Frequency Distribution by Mission Segment for the UH-1H.

As shown in Figure 13 and tabulated below, more time was spent in the gross weight ratio ranges between 0.80 and 0.85 than in any other range. In addition, the UH-1H data are distributed symmetrically about the 0.80 to 0.85 range.

Gross Weight Ratio Range	% Time in Range
Below 0.70	5
0.70 to 0.75	6
0.75 to 0.80	20
0.80 to 0.85	36
0.85 to 0.90	22
0.90 to 0.95	6
0.95 to 1.00	5

In Figure 14, the cumulative gross weight frequency distribution for the UH-1H is compared with similar data for the AH-1G, CH-47A transport, and CH-54A helicopters. The CH-47A transport data were presented to prevent the drawing of any erroneous conclusions about the close agreement of the UH-1H and CH-54A data above gross weight ratios of 0.85. The time spent by the UH-1H at various gross weight ratios is also characteristic of the AH-1G. It is not surprising that these two models, which have the same power and maximum design gross weight, would accumulate time similarly.

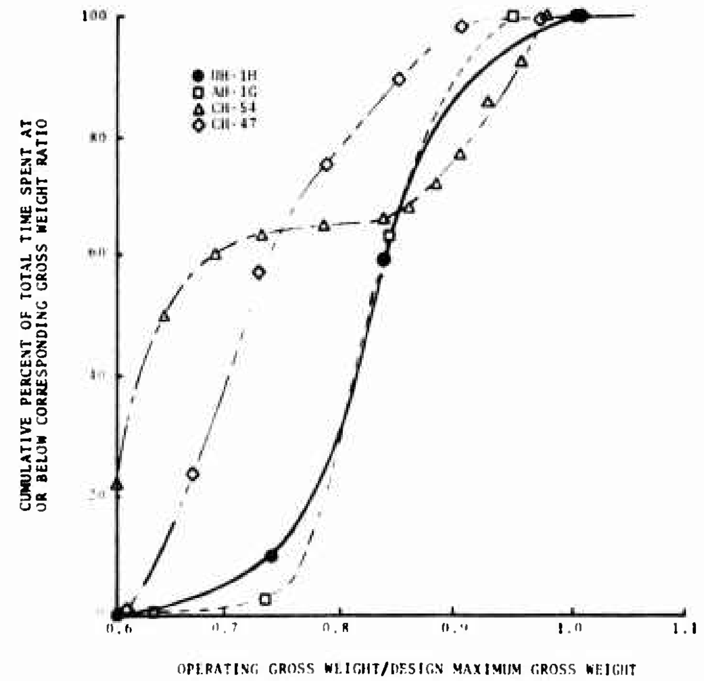


Figure 14. Comparison of Cumulative Gross Weight Frequency Distribution for the UH-1H With Similar Data for the AH-1G, CH-54A, and CH-47 Helicopters.

ENGINE TORQUE

The cumulative engine torque frequency distribution by mission segment for the UH-1H is presented in Figure 15 with respect to the maximum allowable torque expressed as a percentage; these data are listed in the Appendix, Table XI.

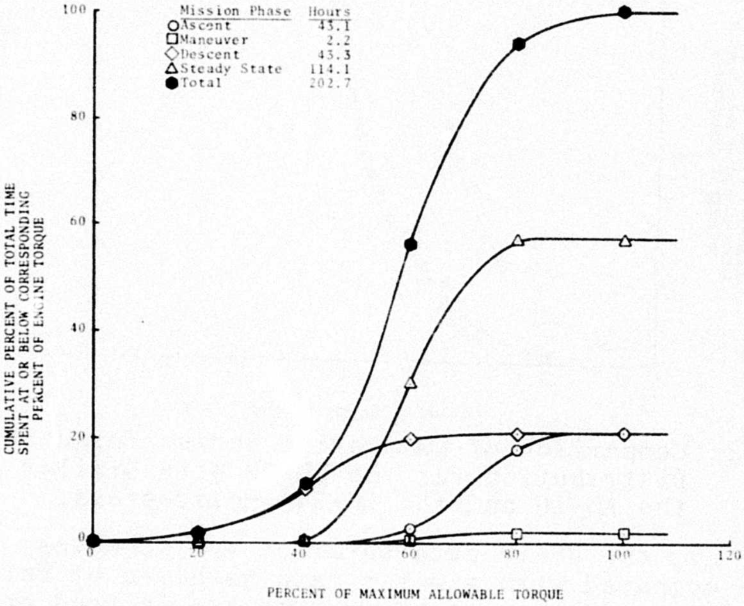


Figure 15. Cumulative Engine Torque Frequency Distribution by Mission Segment for the UH-1H.

Figure 15 indicates that all of the data were acquired during operations at or below 100 percent of the maximum allowable torque. About 63 percent of the total time was spent between torque values of 50 and 75 percent of the maximum allowable torque.

In Figure 16 the cumulative engine torque frequency distribution for the UH-1H data is compared with similar data for the AH-1G and CH-54A helicopters. The general shapes of the curves for the helicopters are quite similar, as would be expected. The main difference between the curves is their location along the engine torque axis. The AH-1G curve differs from the curve presented in Reference 12 since the new curve was derived by using 49.1, instead of 50, psi as the pressure equal to 100 percent of the maximum allowable torque. The value of 49.1 psi was established as the torque limit in Reference 15. According to this new curve, the AH-1G spent about 70 percent of the total time between the torque values of 50 and 75 percent of the maximum allowable torque instead of the previously reported 63 percent (Reference 12).

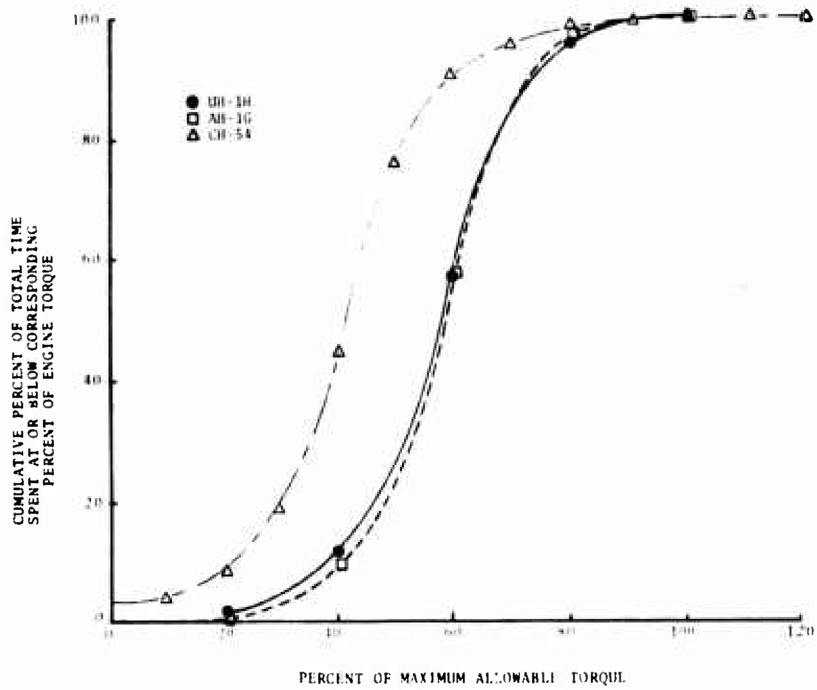


Figure 16. Comparison of Cumulative Engine Torque Frequency Distribution for the UH-1H With Similar Data for the AH-1G and the CH-54A Helicopters.

In Figure 17, the UH-1H data obtained by Technology Incorporated are compared with similar data gathered by Bell Helicopter Company. The two sets of data are in good agreement.

ALTITUDE

The cumulative density altitude frequency distribution by mission segment for the UH-1H is presented in Figure 18; these data are listed in the Appendix, Table VII.

Figure 19 compares the density altitude data for the UH-1H with similar data for the AH-1G and CH-54A. The UH-1H and AH-1G data compare very closely. The CH-54A data do not agree as favorably with the UH-1H data; however, as discussed in Reference 12, the CH-54A helicopter normally cruised at higher altitudes to avoid ground fire. The UH-1H and AH-1G helicopters spent 96 and 97.5 percent of the time, respectively, below altitudes of 5000 feet, whereas the CH-54A spent only 82 percent of its time below this altitude. All three helicopters flew from bases at or very near sea level. The UH-1H did not spend an appreciable amount of time at altitudes above 10,000 feet.

Figure 20 compares the UH-1H data obtained by Technology Incorporated with the similar data obtained by Bell Helicopter Company. The two sets of data are in very good agreement.

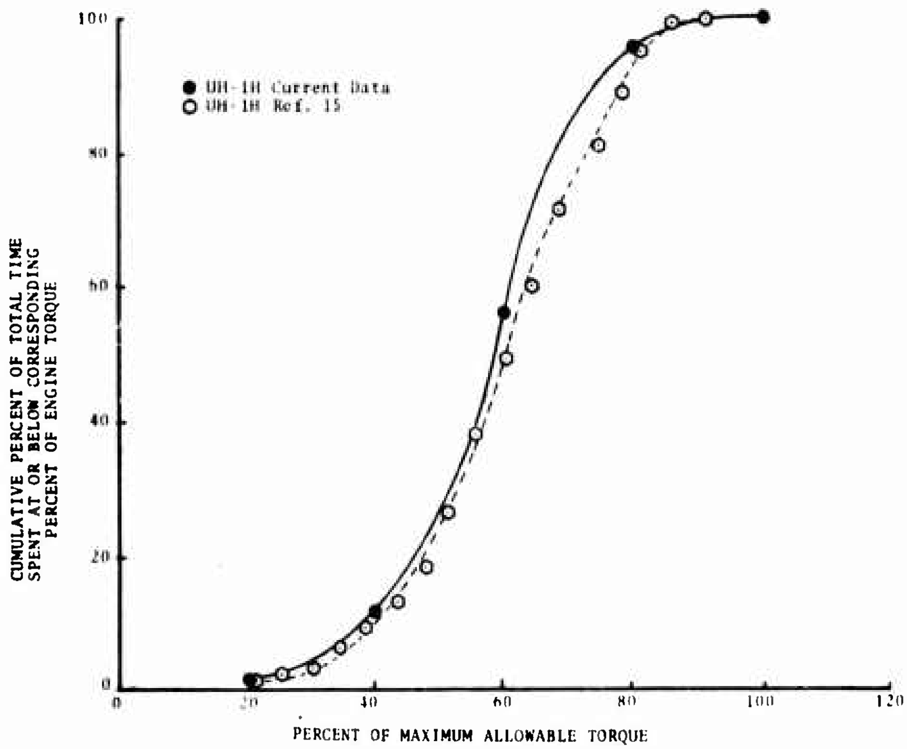


Figure 17. Comparison of Cumulative Engine Torque Frequency Distribution for the UH-1H With Similar SEA Data on the UH-1H Obtained by Bell Helicopter Company.

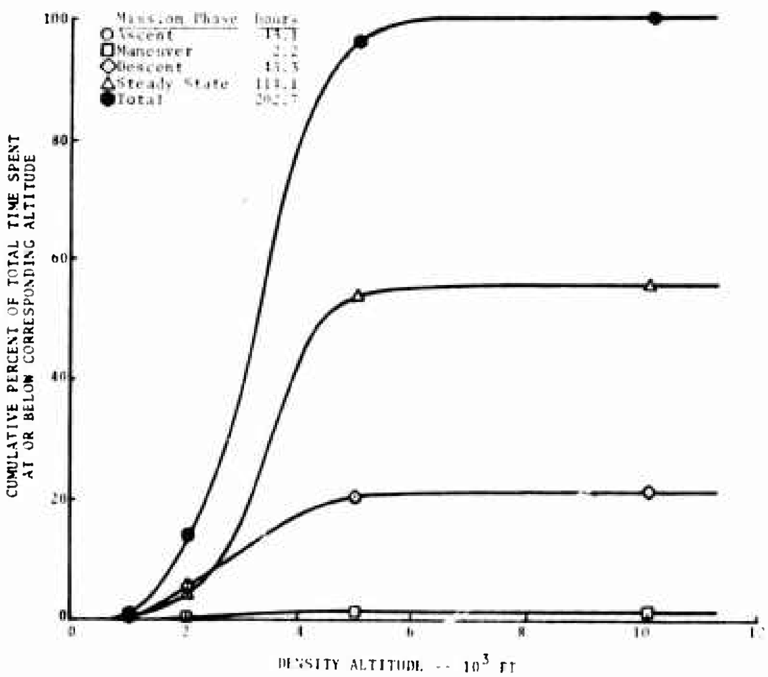


Figure 18. Cumulative Density Altitude Frequency Distribution by Mission Segment for the UH-1H.

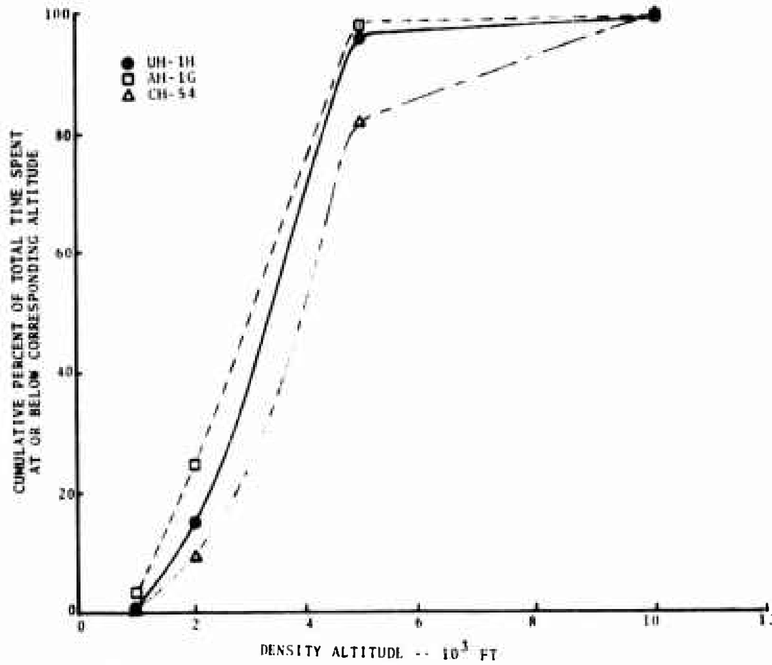


Figure 19. Comparison of Cumulative Density Altitude Frequency Distribution for the UH-1H With Similar Data for the AH-1G and CH-54A Helicopters.

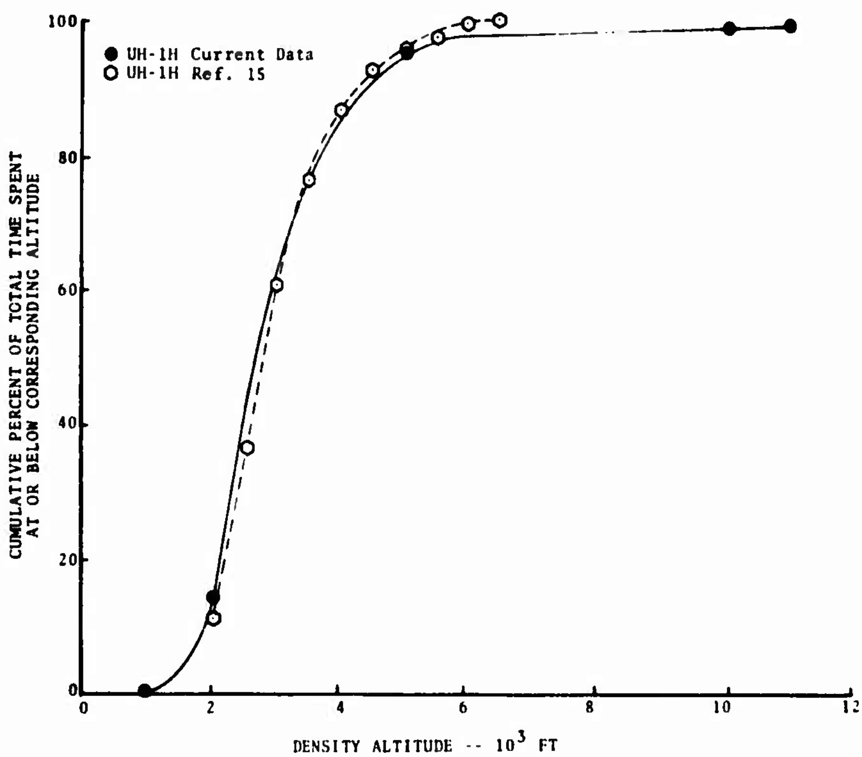


Figure 20. Comparison of Cumulative Density Altitude Frequency Distribution for the UH-1H With Similar SEA Data on the UH-1H Obtained by Bell Helicopter Company.

RATE OF CLIMB

The cumulative rate-of-climb frequency distribution by mission segment for the UH-1H is presented in Figure 21; the rate-of-climb data were converted into the "or more" type of frequency distributions by cumulatively summing the percentages of time for each rate-of-climb range, starting at the highest positive or negative rate-of-climb value and continuing to the ±300 feet-per-minute threshold value. The basic data, prior to summation, are presented in Table X of the Appendix. Because of the basic definitions used to categorize the flight data into the four mission segments, some ascent time is included in the negative rate-of-climb data and some descent time is included in the positive rate-of-climb data. Also, the data should not be extrapolated beyond that presented, as highly erroneous predictions could result.

The cumulative rate-of-climb frequency distribution for the UH-1H is compared in Figure 22 with similar data for other turbine-powered helicopters having a normal design gross weight of less than 10,000 pounds (Reference 14). For rates of climb in excess of 900 feet per minute, the UH-1H data fell within the scatter bands; but for rates below 900 feet per minute, the data fell outside the upper scatter band. With respect to the rates of descent, the UH-1H data fell within the middle of the scatter bands for the entire rate-of-descent range. Once again, the $\pm 1\sigma$ scatter band developed in Reference 14 for turbine-powered helicopters having a normal design gross weight of less than 10,000 pounds is a good representation of the rate-of-climb operation characteristic of the UH-1H.

In Figure 23, the cumulative rate-of-climb frequency distribution for the UH-1H helicopter is compared with similar data for the AH-1G and CH-54A helicopters. The UH-1H helicopter had milder rate-of-climb excursions; in general, it did not exceed rates of 1500 feet per minute. During descents, the UH-1H helicopter had a rate-of-descent operation similar to that of the CH-54A helicopter; the UH-1H made descents at rates up to 2100 feet per minute.

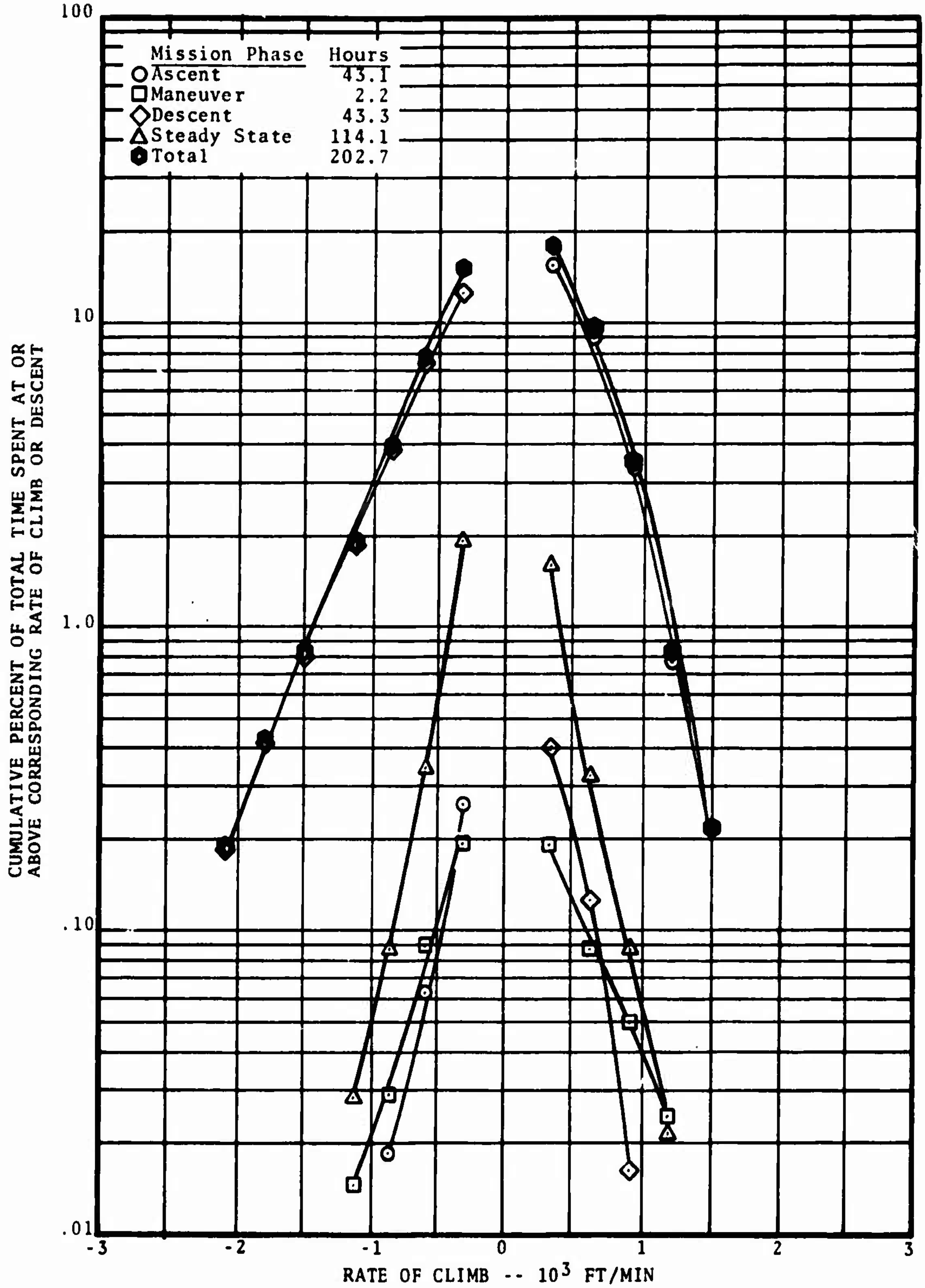


Figure 21. Cumulative Rate-of-Climb Frequency Distribution by Mission Segment for the UH-1H.

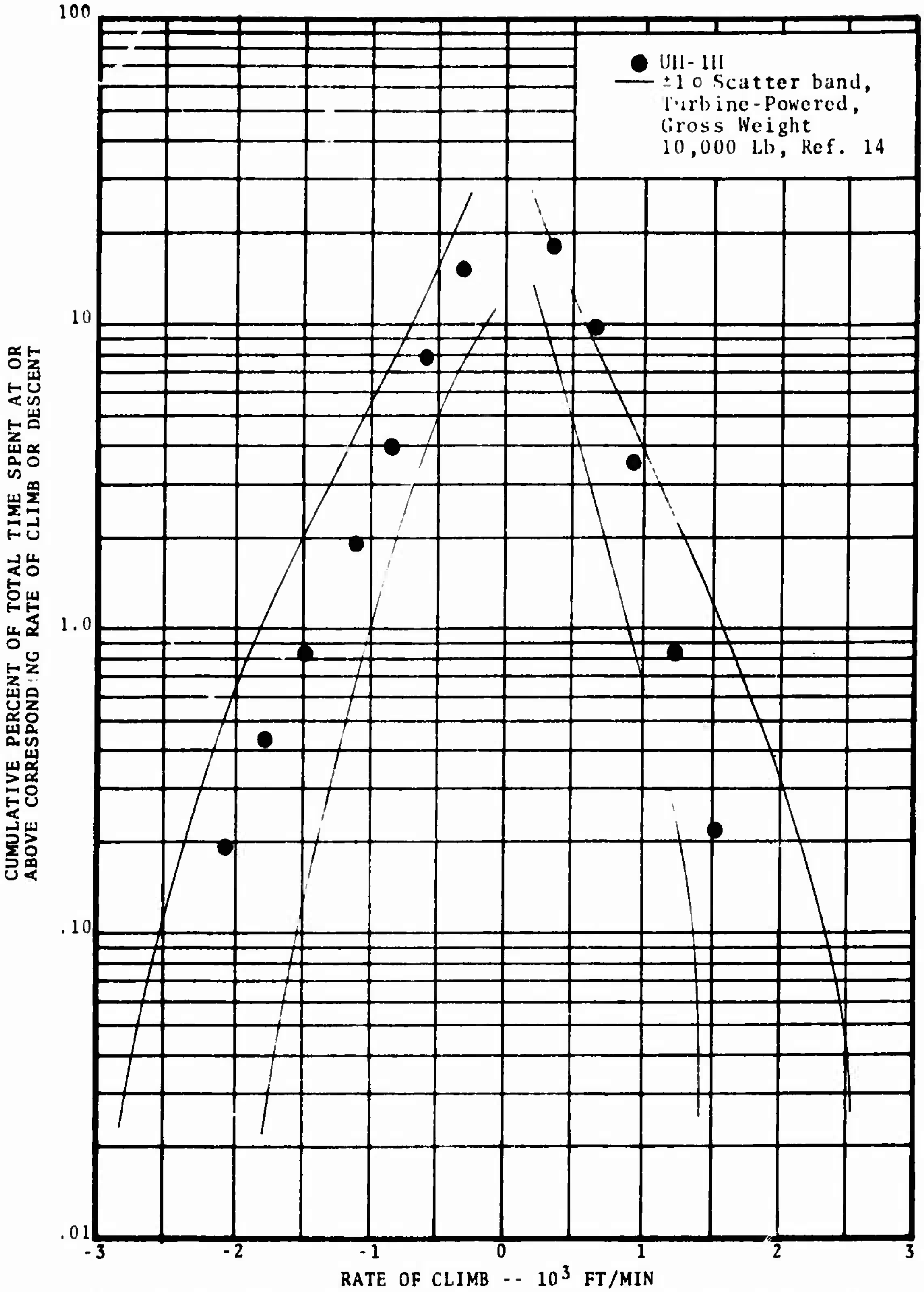


Figure 22. Cumulative Rate-of-Climb Frequency Distribution for the UH-1H Compared With Spectra Data Obtained for Other Turbine-Powered Helicopters With Design Normal Gross Weights <10,000 Lb.

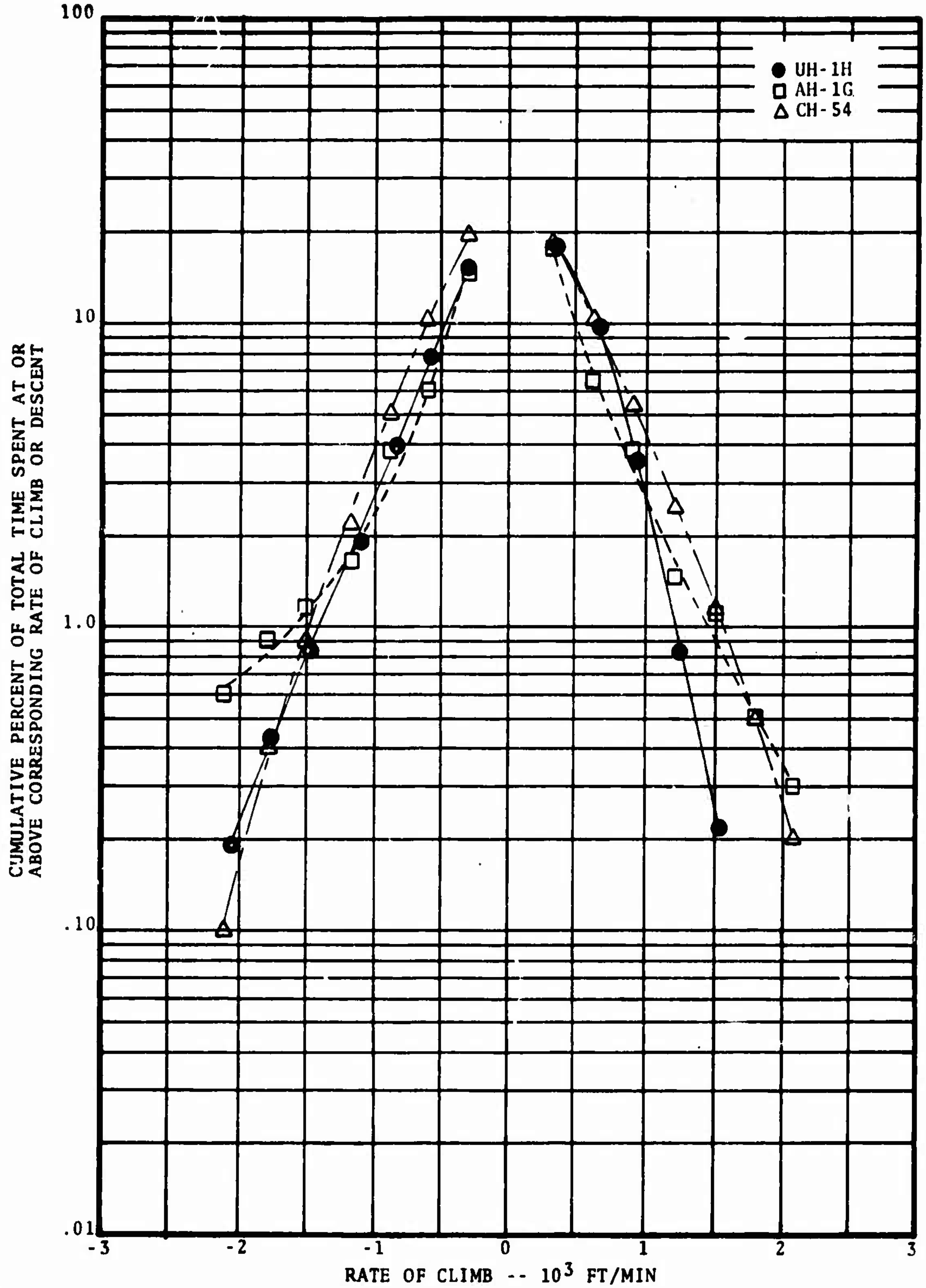


Figure 23. Comparison of Cumulative Rate-of-Climb Frequency Distribution for the UH-1H With Similar Data for the AH-1G and CH-54A Helicopters.

NORMAL OR VERTICAL LOAD FACTORS

Both positive and negative load factor peaks experienced by the UH-1H helicopter during the current program are presented in several different ways for both gust and maneuver conditions. The peaks caused by gust conditions are compared with $\pm 1\sigma$ scatter bands for all helicopters and with similar data for the AH-1G and CH-54A helicopters. The maneuver-induced load factor peaks are presented similarly as above; in addition, the distributions of these factors in gross weight and rotor tip speed ranges are compared. Also compared are the UH-1H, AH-1G, and CH-54A cumulative load factor peaks with an airspeed breakdown.

Three different types of exceedance curves were used to present the data in the formats discussed above. The basic data for gust and maneuver conditions are presented in terms of "hours to reach or exceed" a given normal load factor level. The comparisons of either the gust or the maneuver data are presented as the cumulative number of load factor peaks per 1000 hours experienced at or in excess of the corresponding value of Δn_z; these numbers were obtained by cumulatively summing the occurrences of load factor peaks, starting at the largest positive or negative load factor peaks and then converting these cumulative occurrence values to cumulative peaks per 1000 hours. The format of the comparison of cumulative load factor peaks by airspeed curves is similarly based on the cumulative number of load factor peaks per 1000 hours experienced at or below a given airspeed value; for each airspeed value, this curve was constructed as discussed above for the curves plotted versus Δn_z.

In all cases, the Δn_z value was derived by the equation of $\Delta n_z = n_z - 1$. The airspeed values were expressed in terms of the percentage of V_{ne} or V_h, whichever was lower. For the UH-1H and CH-54A helicopters, the V_{ne} speeds of 120 and 110 knots, respectively, were used; for the AH-1G helicopter, the V_h speed of 158 knots was used.

Figure [illegible] presents the composite exceedance curve of incremental gust-induced normal load factor peaks for the UH-1H. As can be seen, slightly more negative peaks were experienced than positive peaks; however, the magnitudes of both the positive and negative peaks are not significant when compared with the magnitudes of the maneuver-induced normal load factor peaks (see Figure 28).

Figure 25 compares the cumulative gust-induced normal load factor frequency distribution of the UH-1H data with the $\pm 1\sigma$ scatter band curves derived in Reference 2 for similar data

for all turbine-powered helicopters. This figure indicates that the UH-1H helicopter was not exposed to gust-induced loads above the lower scatter band; for both the positive and negative peaks, the number of peaks per 1000 hours was about an order of magnitude below the lower scatter band.

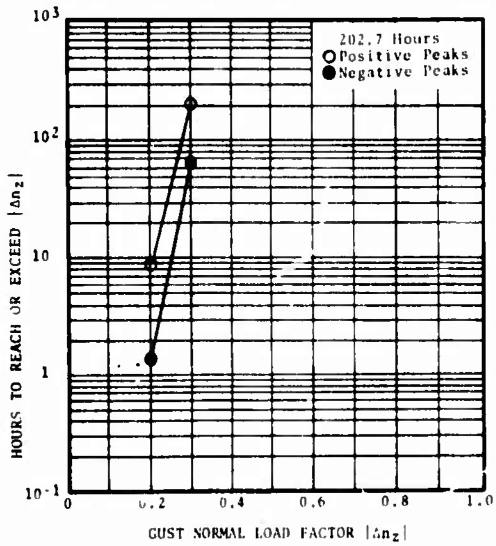


Figure 24.

Composite Exceedance Curve for Incremental Gust Normal Load Factor Peaks.

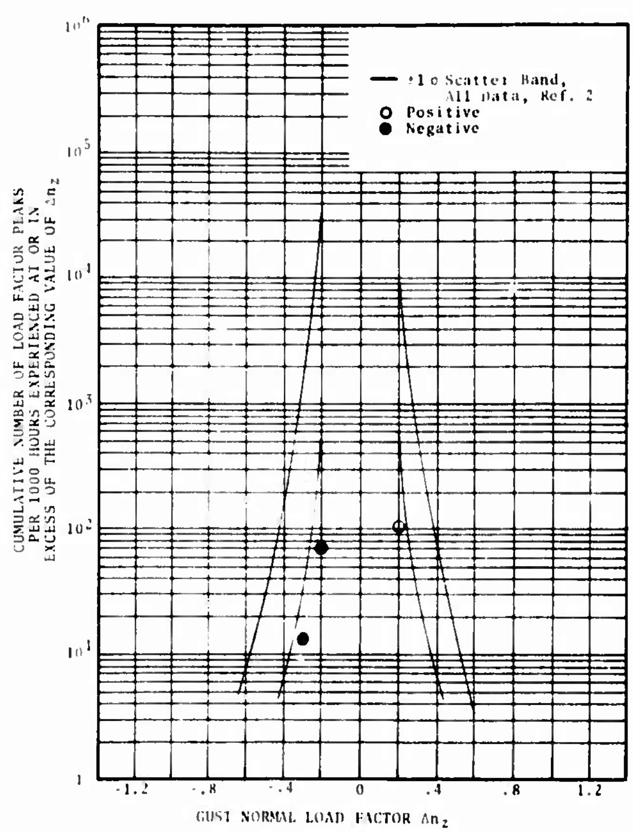


Figure 25.

Cumulative Gust-Induced Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for All Other Turbine-Powered Helicopters.

Figures 26 and 27 present the cumulative positive and negative gust-induced normal load factor frequency distributions for the UH-1H data in comparison with similar data for the AH-1G and CH-54A helicopters. As evident in both figures, the gust-induced loads for the UH-1H helicopter were equal to or below those for the AH-1G and CH-54A helicopters. From the above, it can be deduced that gust-induced normal load factor peaks experienced by the UH-1H helicopter are lower in both frequency and magnitude.

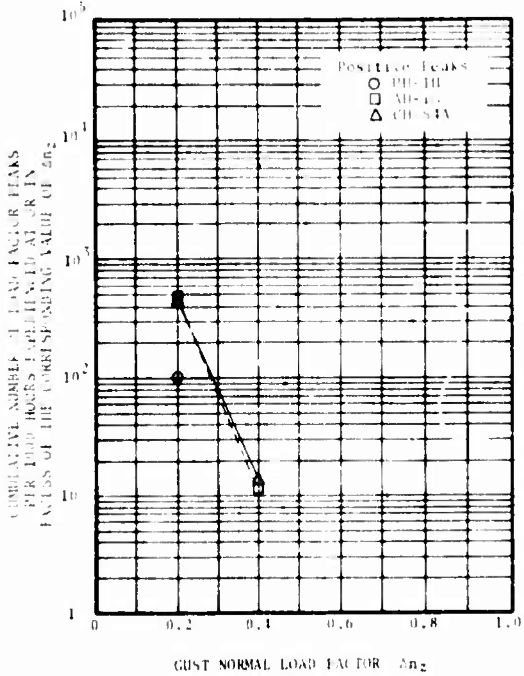


Figure 26.

Cumulative Gust-Induced Positive Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for the AH-1G and CH-54A Helicopters.

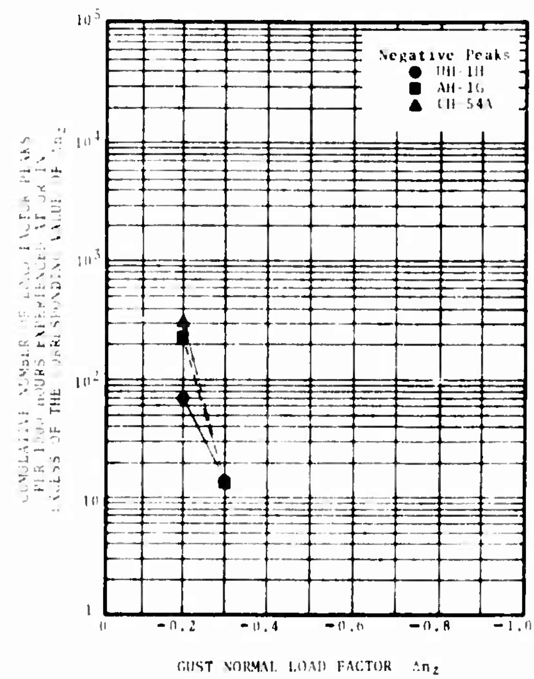
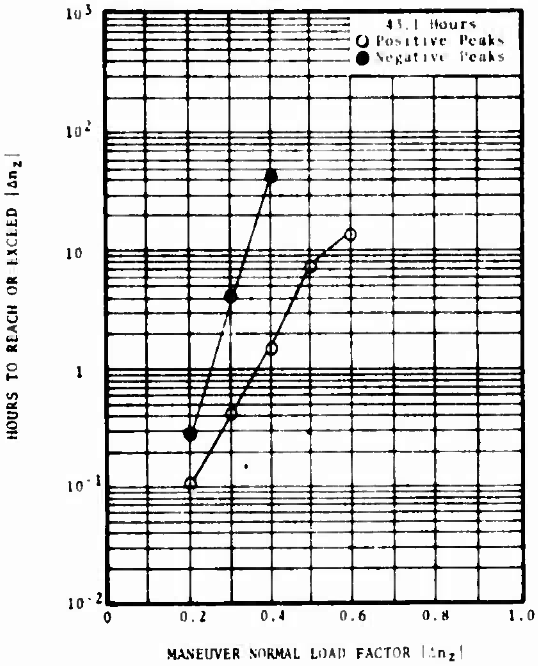


Figure 27.

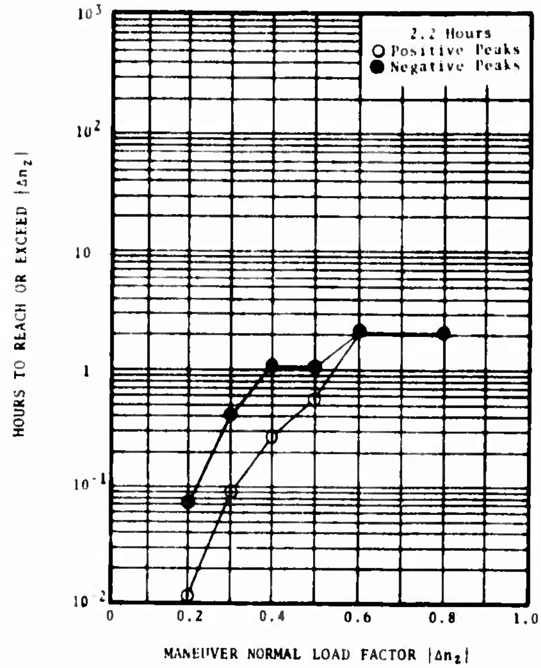
Cumulative Gust-Induced Negative Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for the AH-1G and CH-54A Helicopters.

Figure 28 presents exceedance curves of incremental maneuver-induced normal load factor peaks by mission segment for the UH-1H. In general, more positive load factor peaks were experienced during all mission segments than negative peaks. Also, both positive and negative peaks occurred most frequently in the maneuver and descent mission segments. The high frequency of occurrence of load factor peaks in the maneuver segment would have been expected because of the definition of this segment; however, the reason for the high frequency of both positive and negative peaks in the descent segment is not as obvious. As an explanation of the relatively high frequency of positive and negative peaks during the descent segment, the pilot was faced with the stringent terrain-clearance requirements prior to touchdown; consequently, to maintain a safe descent, he had to continually input minor flight-path corrections which would have induced a larger number of positive and negative peaks. Another reason for the high frequency of negative peaks during the descent segment is that the mean vertical load factor was slightly less than unity; consequently, minor perturbations, which would have normally been filtered from the data for the other mission segments during processing, produced load factor peaks that were below the 0.8g threshold and were included in the data sample. The curve shape of the positive and negative peaks for the ascent and steady-state segments are very similar; the hours to reach or exceed a given value of Δn_z for the steady-state segment are about an order of magnitude greater than the hours for the ascent segment. The largest positive peak of 0.6g occurred during all mission segments; the largest negative peak of 0.8g occurred during the maneuver segment only. Finally, the composite maneuver-induced normal load factor peak curve gives the range of the positive and negative values and shows that the UH-1H experienced more positive than negative peaks.

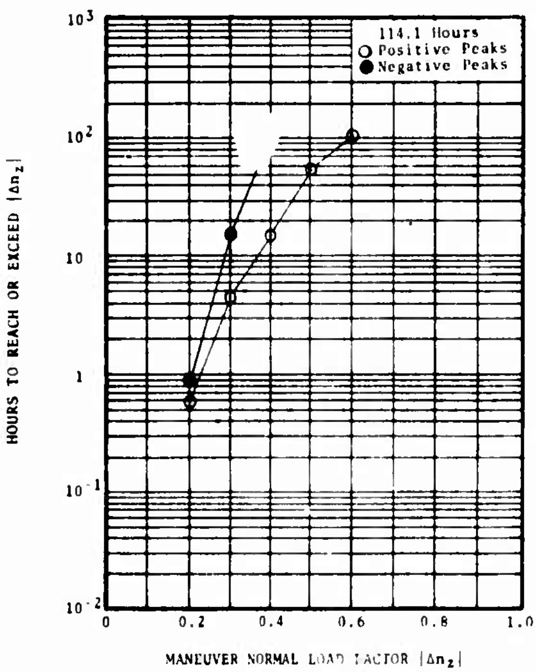
Figure 29 compares the cumulative maneuver-induced normal load factor frequency distribution of the UH-1H with the $\pm 1\sigma$ scatter band curves derived in Reference 2 for similar data for all turbine-powered helicopters. This figure indicates that the maneuver-induced loads of the UH-1H were basically within the $\pm 1\sigma$ scatter bands; only one data point fell outside the bounds of the curve at a Δn_z value of -0.7g.



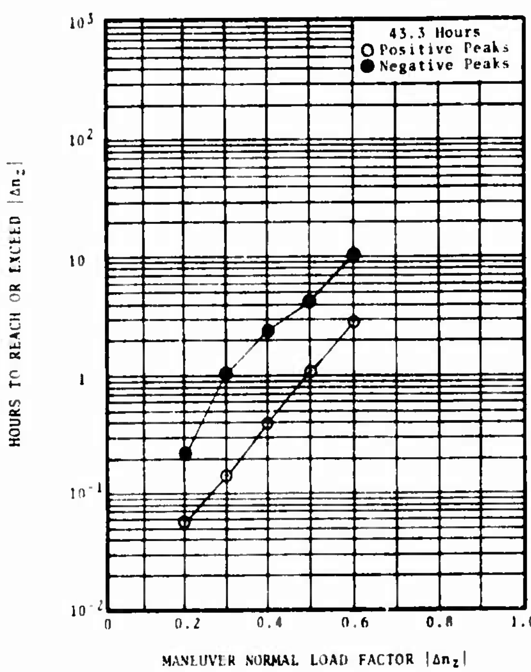
a) Ascent



b) Maneuver

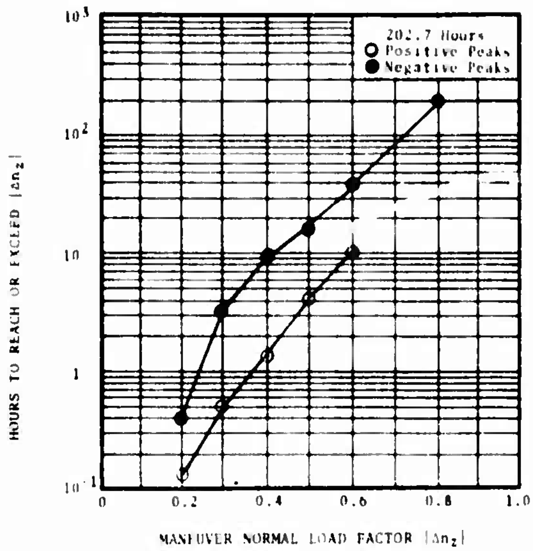


c) Descent



d) Steady State

Figure 28. Exceedance Curves for Incremental Maneuver Normal Load Factor Peaks by Mission Segment.



c) Composite

Figure 28 - Concluded

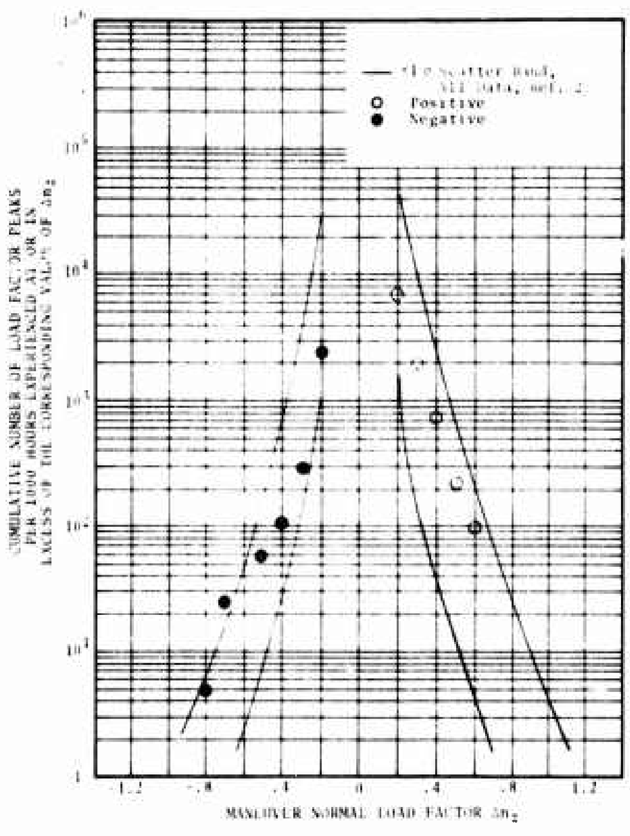


Figure 29. Cumulative Maneuver-Induced Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for All Other Turbine-Powered Helicopters.

The cumulative positive and negative normal load factor peak curves for the UH-1H are compared with similar curves for the AH-1G and CH-54A helicopters in Figures 30 and 31 to determine operational similarities during maneuvering flight. As discussed above, these curves were constructed by cumulatively summing the occurrences of load factor peaks, starting at the largest positive or negative peak and converting these cumulative occurrence values to cumulative peaks per 1000 hours. Figure 30 compares positive normal load factor peaks for the various helicopters. For positive Δn_z values of approximately 0.4g to 0.6g, the UH-1H curve is nearly identical to the CH-54A curve; below 0.4g, the UH-1H had more positive load factor peaks than the CH-54A, but not nearly the number of peaks experienced by the AH-1G helicopter. At a Δn_z of 0.2g, the UH-1H, CH-54A, and AH-1G had about 7000, 2000, and 30000 peaks per 1000 hours, respectively. In contrast, Figure 31 for the negative normal load factor peaks shows very close similarity between the UH-1H and AH-1G experiences.

Throughout the entire range of negative normal load factor peaks, the UH-1H data were at or just below the corresponding values for the AH-1G data; within the same range, the CH-54A experienced far fewer negative peaks per 1000 hours. For the AH-1G and CH-54A data, the spread between the positive load factor peaks is much greater than that between the negative peaks. The interpretation of the foregoing data becomes difficult when trying to relate the UH-1H experience with that of some class of helicopter for the purpose of developing a realistic and conservative flight spectrum. The close agreement of the positive maneuver-induced normal load factors for the CH-54A and UH-1H helicopters may be attributed to the similarity of their mission segments. The large number of peaks in the AH-1G data occurred mostly in the maneuver mission segment. If the UH-1H had spent more time in the maneuver mission segment, it would likely have had the same experience as the AH-1G. In contrast, the above data show that UH-1H and AH-1G helicopters closely agreed in the distribution of negative maneuver-induced normal load factor peaks. The data in Reference 12 indicate that the normal load factor occurrences during the descent segment were similar to those during the maneuver segment, just as the UH-1H data show in Figure 28. Consequently, the similarity between the data of the UH-1H and AH-1G helicopters may be attributed to their similar size, gross weight, and response to negative g's during maneuvers and descents to landings.

For each of the above maneuvers, the values for rotor speed, indicated airspeed (V_i), density altitude, gross weight, μ, C_T/σ, outside air temperature (OAT), rate of climb, and engine torque were calculated at a time slice near the n_z peak

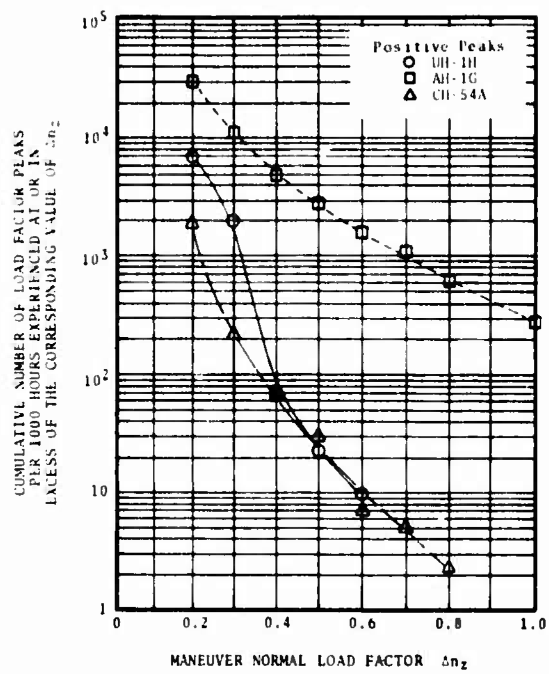


Figure 30. Cumulative Maneuver-Induced Positive Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for the AH-1G and CH-54A Helicopters.

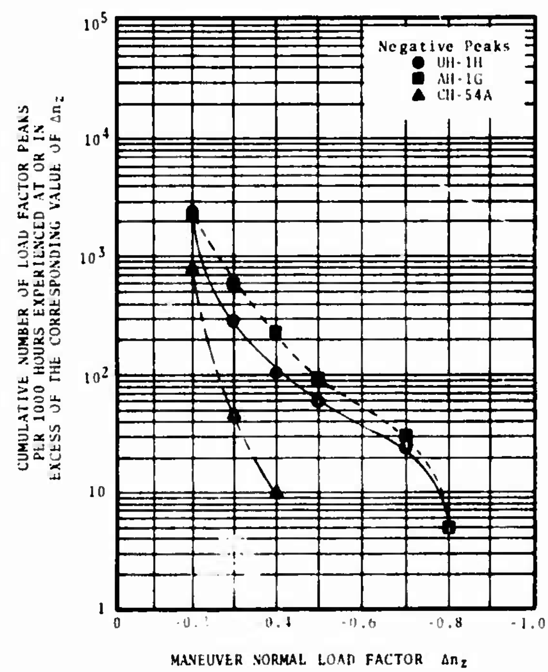


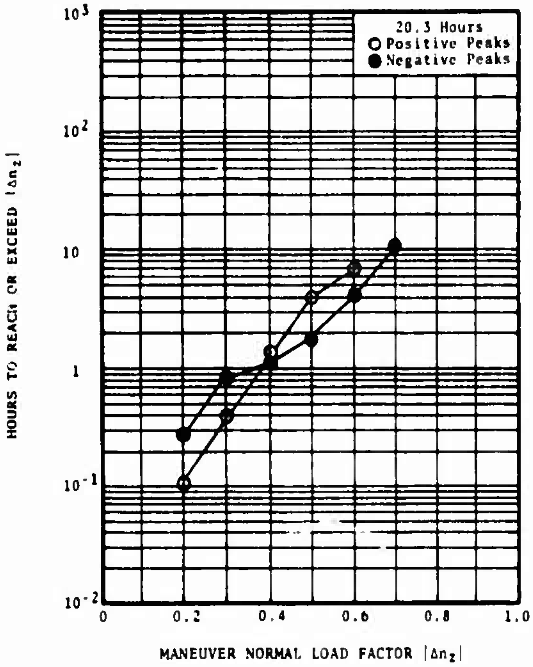
Figure 31. Cumulative Maneuver-Induced Negative Normal Load Factor Frequency Distribution for the UH-1H Compared With Similar Data for the AH-1G and CH-54A Helicopters.

and written on a reproduction of the oscillogram section containing the maneuver. Then the recorded traces were identified by the parameter name; the reference lines for torque = 0 psi, n_z = 1.0g, rotor speed = 0.0 rpm, and V_i = 0.0 knot were indicated; and the calibration slopes (parameter change for 1.0-inch trace deflection) for torque, n_z, rotor speed, and V_i were noted. The following list gives the sign convention for the UH-1H oscillograph recording system:

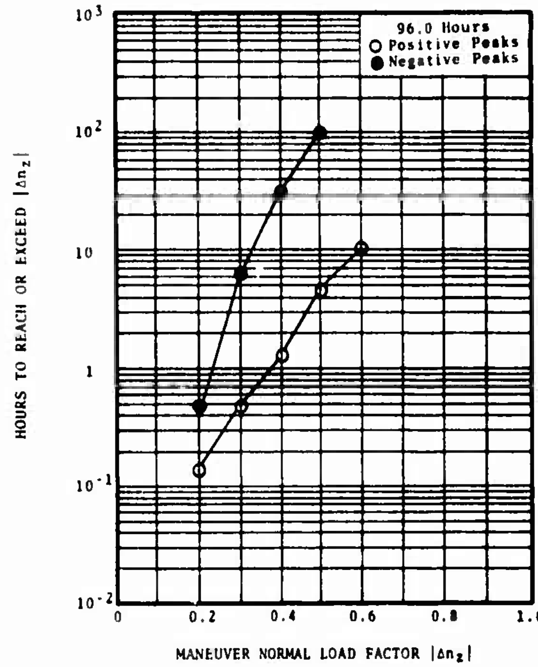
(1) Airspeed moves up the chart as airspeed increases.
(2) Altitude moves down the chart as altitude increases.
(3) Rotor speed moves up the chart as rpm increases.
(4) OAT moves down the chart as OAT increases.
(5) Torque moves down the chart as torque increases.
(6) N_x, N_y, N_z movement up the chart is positive and down the chart is negative.
(7) Longitudinal cyclic boost tube load moves down the chart when the load is positive.
(8) Lateral cyclic boost tube load moves down the chart when the load is positive.
(9) Collection boost tube load moves up the chart when the load is positive.

Figure 32 presents exceedance curves of maneuver-induced normal load factor peaks by gross weight ranges for the UH-1H. The rate of positive load factor peak accumulation, or its inverse, the hours to reach or exceed a given Δn_z, was nearly the same throughout the three weight ranges. In addition, the range of the positive Δn_z's remained constant throughout the three weight ranges. In contrast, the range of negative Δn_z's decreased as the gross weight of the UH-1H increased. The rate of negative load factor peak accumulation was practically the same throughout the Δn_z range for the weight ranges of 7000 to 8000 pounds and 8000 to 9500 pounds. Above a Δn_z of 0.3g, the rate of negative peak accumulation was much greater for the 6000- to 7000-pound weight range. Although a satisfactory explanation for this fact would require more data about the helicopter's dynamic response, the phenomenon may have been a result of the control characteristics of the helicopter at low gross weights and the corresponding center-of-gravity locations.

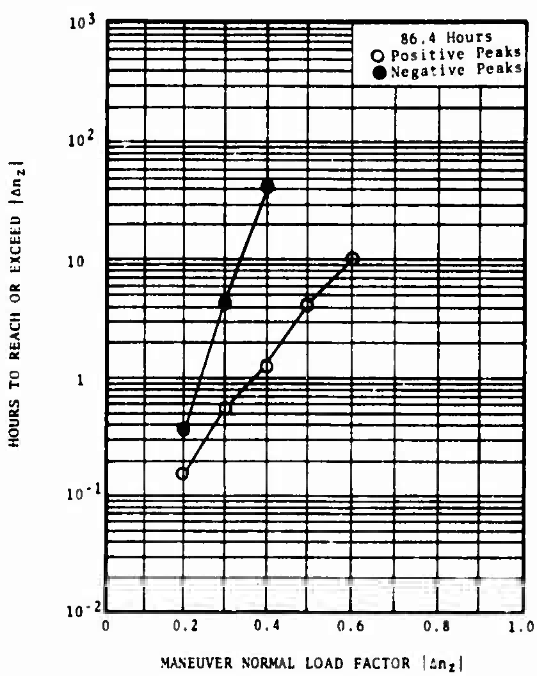
Figure 33 presents a diagram and tabulation of maneuver-induced normal load factor peaks with respect to the tip speed ratio, μ. This figure also includes three sample oscillograms to show extreme n_z or μ values. As indicated in this figure, the higher load factor peaks occurred within the μ range of 0.10 to 0.25, and the lower load factor peaks fell between 0.15 and 0.20. Based on the data in Figure 33a, Figures 33b, c, and d show the maximum n_z, minimum n_z, and maximum μ values as 1.60g, 0.12g, and 0.257μ, respectively.



a) 6000-7000 Lb



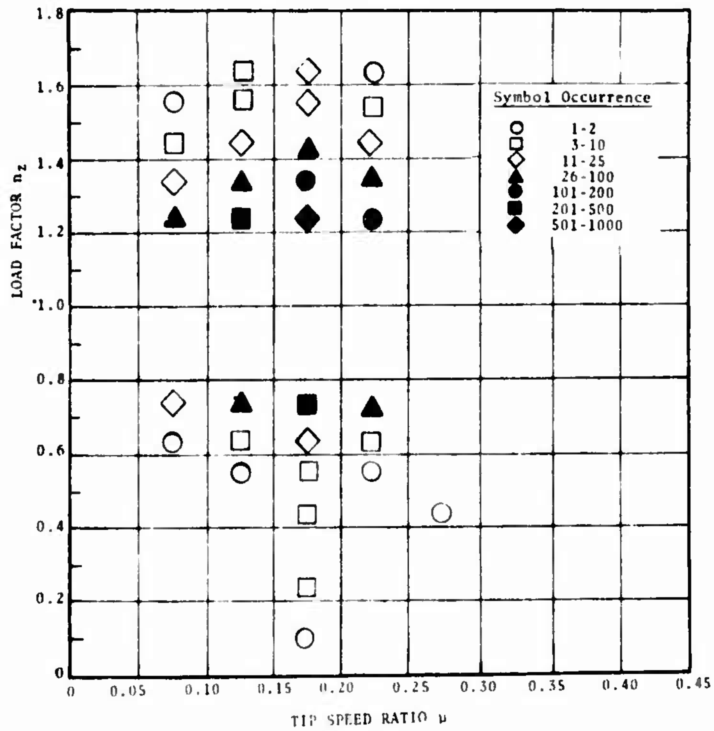
b) 7000-8000 Lb



c) 8000-9500 Lb

Figure 32. Exceedance Curves for Incremental Maneuver Normal Load Factor Peaks by Gross Weight Range.

These oscillogram sections permit examination of the parameter time histories during the maneuvers of interest. For example, Figure 33b shows a maneuver with an n_z peak of 1.60g. The distance between the n_z reference line (1g) and the reading reference line is 1.40 inches, and the distance between the peak of the n_z trace and the reading reference line is 0.99 inch, giving a trace deflection of 0.41 inch at the peak. The product of this deflection and the n_z slope (1.45g per inch) equals 0.60g as the incremental n_z value. The n_z value of 1.60 is the sum of the 0.60g incremental n_z value and the 1.0g reference n_z value. Similar measurements yield trace deflections of 0.56 inch for torque, 2.72 inches for rotor speed, and 0.43 inch for V_i, which, after calibration, have values of 13.0 psi for torque, 328 rpm for rotor speed, and 0.51 inch of mercury (differential pressure) for airspeed. Converted to indicated airspeed, the differential pressure equals 103 knots. A short vertical line at the lower edge of the oscillogram indicates the time when the n_z peak was measured, and a longer vertical line indicates the time when all other parameters were measured.

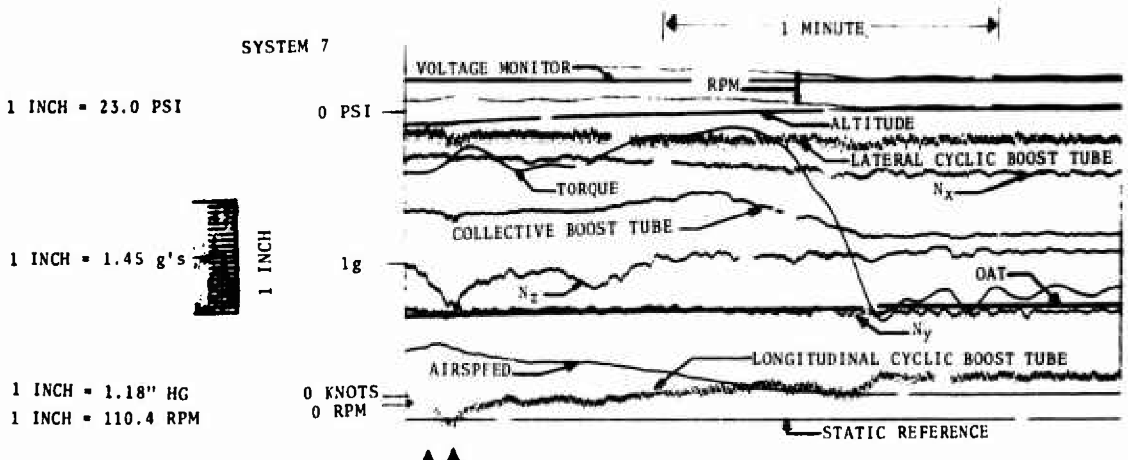


a) Composite Data

Figure 33. Diagram and Tabulation of Maneuver Normal Load Factor Peaks in Ranges of Rotor Tip Speed Ratio With Oscillograms Containing Extreme Values.

LOAD FACTOR n_z	TIP SPEED RATIO, μ <0.05	0.05 to 0.10	0.10 to 0.15	0.15 to 0.20	0.20 to 0.25	0.25 to 0.30	≥0.30	TOTAL
1.7 to 1.8								
1.6 to 1.7			4	15	1			20
1.5 to 1.6		1	3	17	6			27
1.4 to 1.5		4	19	68	11			102
1.3 to 1.4		11	83	138	26			258
1.2 to 1.3		55	259	547	124			985
0.8 to 1.2								
0.7 to 0.8		20	97	273	53			443
0.6 to 0.7		2	8	20	7			37
0.5 to 0.6			2	7	1			10
0.4 to 0.5				6		1		7
0.2 to 0.4				4				4
<0.2				1				1
TOTAL		93	475	1096	229	1		1894

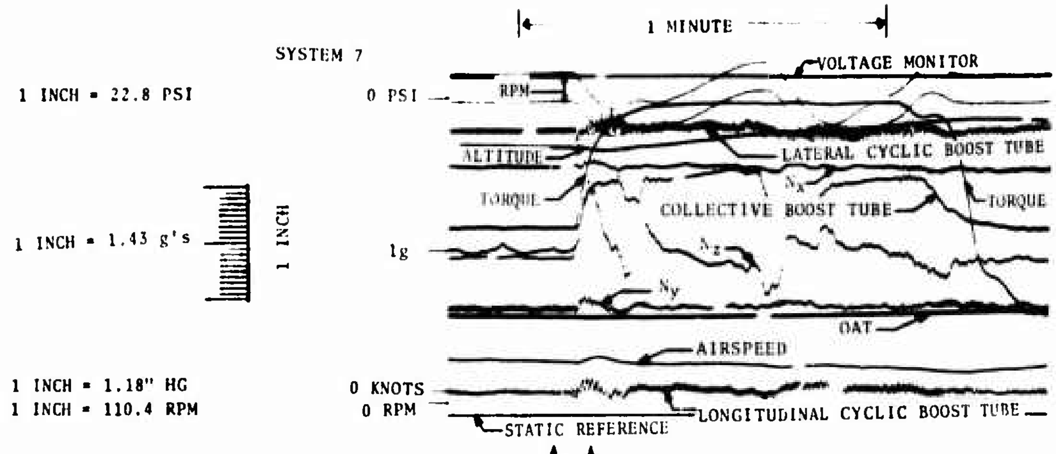
a) Composite Data (Continued)



N_z = 1.60 g's
RPM = 328
V_i = 103 Kn
Density Altitude = 2293 Ft
Gross Weight = 7879 Lb
μ = 0.2107
C_T/σ = 0.0619
OAT = 80.3°F
Climb = -1702 Ft/Min
Torque = 13.0 PSI

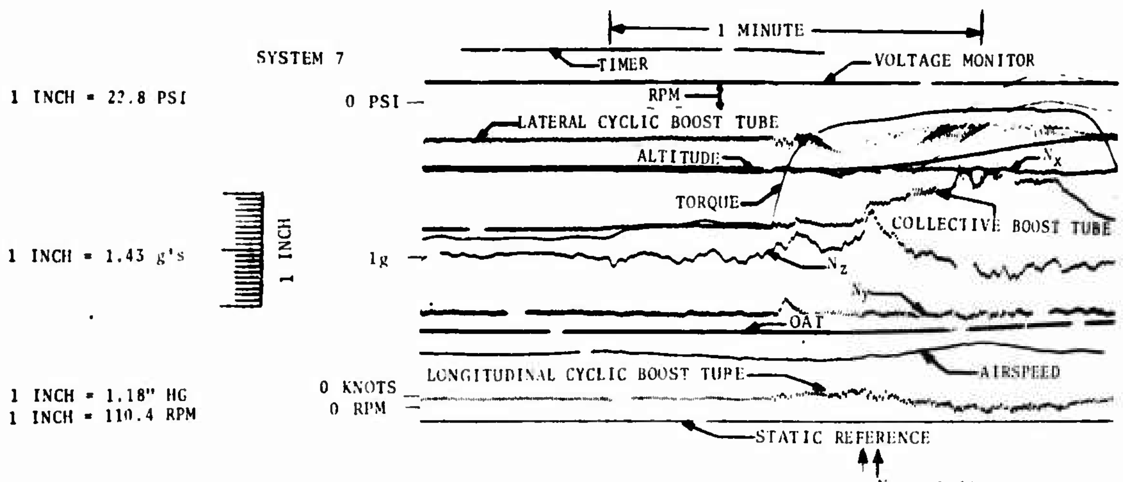
b) Oscillogram of Maneuver for Maximum n_z

Figure 33 - Continued



N_z = 0.12 g's
RPM = 324
V_i = 77 Kn
Density Altitude = 3626 Ft
Gross Weight = 6538 Lb
μ = 0.1608
C_T/σ = 0.0551
OAT = 87.2°F
Climb = -1414 Ft/Min
Torque = 33.2 PSI

c) Oscillogram of Maneuver for Minimum n_z



N_z = 0.42 g's
RPM = 242
V_i = 92 Kn
Density Altitude = 3940 Ft
Gross Weight = 6920 Lb
μ = 0.2568
C_T/σ = 0.1053
OAT = 82.2°F
Climb = -2100 Ft/Min
Torque = 36.5 PSI

d) Oscillogram of Maneuver for Maximum μ

Figure 33 - Concluded

The cumulative vertical load factor frequency distribution by airspeed for the UH-1H is presented in Figure 34 and is compared with similar data for the AH-1G and CH-54A helicopters in Figure 35. The frequency of normal load factor peaks are expressed as the cumulative number of gust- and maneuver-induced normal load factor peaks per 1000 hours experienced at or below the corresponding airspeed value. Airspeed values in Figures 34 and 35 are expressed in terms of percentage of V_{ne} or V_h, whichever is lower. For the UH-1H and CH-54A helicopters, the V_{ne} speeds of 120 and 110 knots, respectively, were used; for the AH-1G, the V_h speed of 158 knots was used.

The cumulative vertical load factor by airspeed curves for the UH-1H indicate that, for all airspeed ranges, lower-magnitude incremental load factor peaks were more frequent than higher-magnitude peaks and that positive peaks of a given magnitude were more common than negative peaks of the same magnitude. Further, positive normal load factor peaks occurred most frequently in the V_{ne} range between 48 and 73 percent and independently of the normal load factor range. The negative load factor peaks display a similar dependence on airspeed for incremental values of -0.2g and -0.3g; however, for incremental values less than -0.3g, the greatest number of peaks occurred in the V_{ne} range between 58 and 70 percent.

Figure 35 indicates that, for all positive incremental load factor ranges, the UH-1H cumulative peak frequency distributions are quite similar to those for the AH-1G; however, in general, most of the AH-1G peaks occurred at V_h airspeeds between 25 and 75 percent. This larger range of airspeed for a given positive incremental peak range most likely indicates that most of the AH-1G peaks occurred in a wide airspeed range during the maneuver segment and that most of the UH-1H peaks occurred in a relatively narrow airspeed range during the descent segment.

The cumulative peak frequency curves for the CH-54A are much flatter and lower than those for the AH-1G and the UH-1H. For negative incremental load factor values, the UH-1H and AH-1G peak frequency versus airspeed curves again compare quite well. Again, the AH-1G peaks occurred over a larger airspeed range than the UH-1H peaks. The tendency of the UH-1H data to fall between the AH-1G and the CH-54A data is also observed; however, for a Δn_z of -0.2g, the UH-1H curve displays more peaks throughout the airspeed range than the AH-1G curve. This could be due to a combination of the previously noted tendency of the UH-1H to encounter significantly large numbers of negative load factors at low gross weights and the generally higher gross weights borne by the AH-1G.

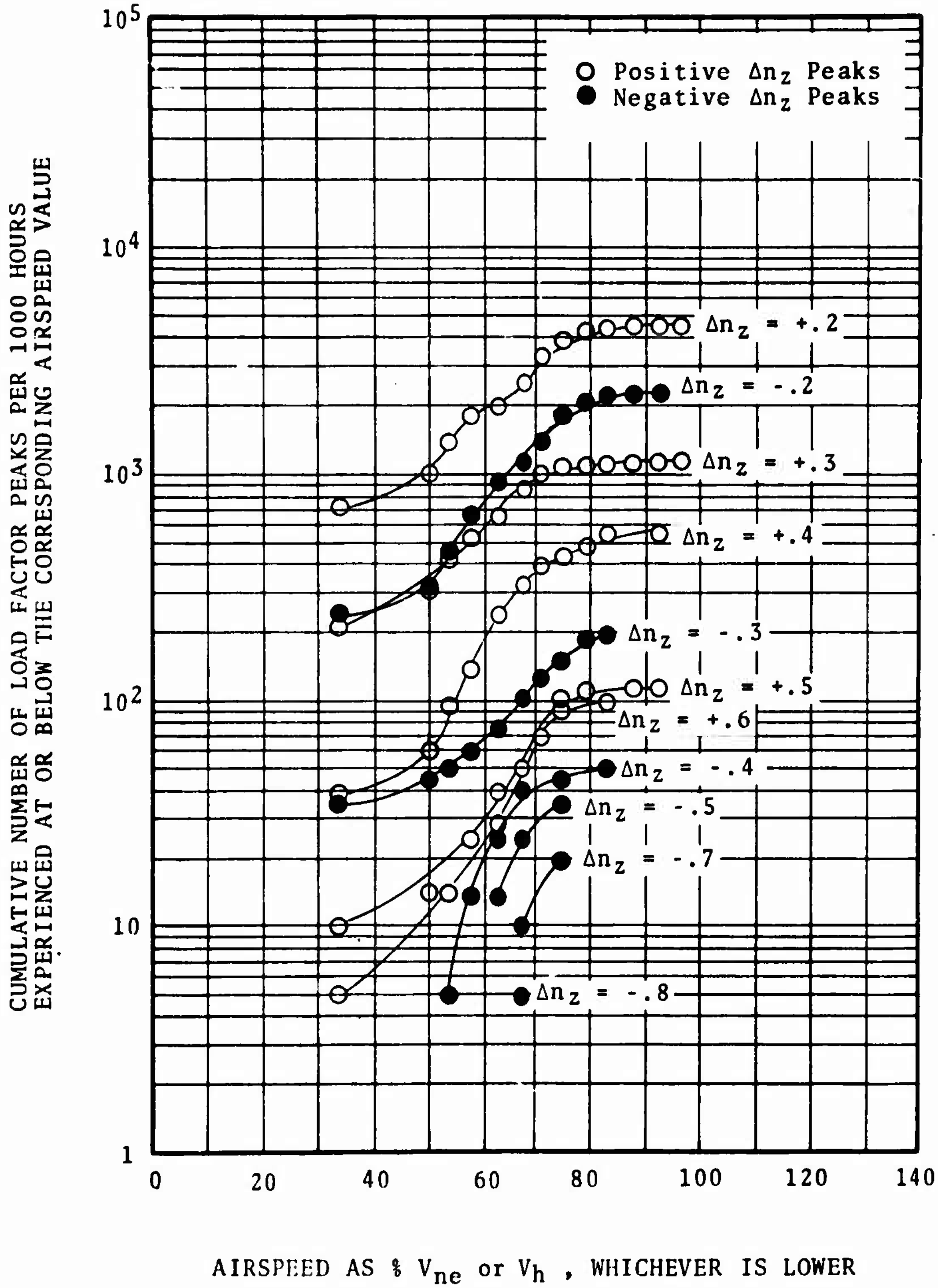


Figure 34. Composite Cumulative Normal Load Factor Frequency Distribution by Airspeed for the UH-1H.

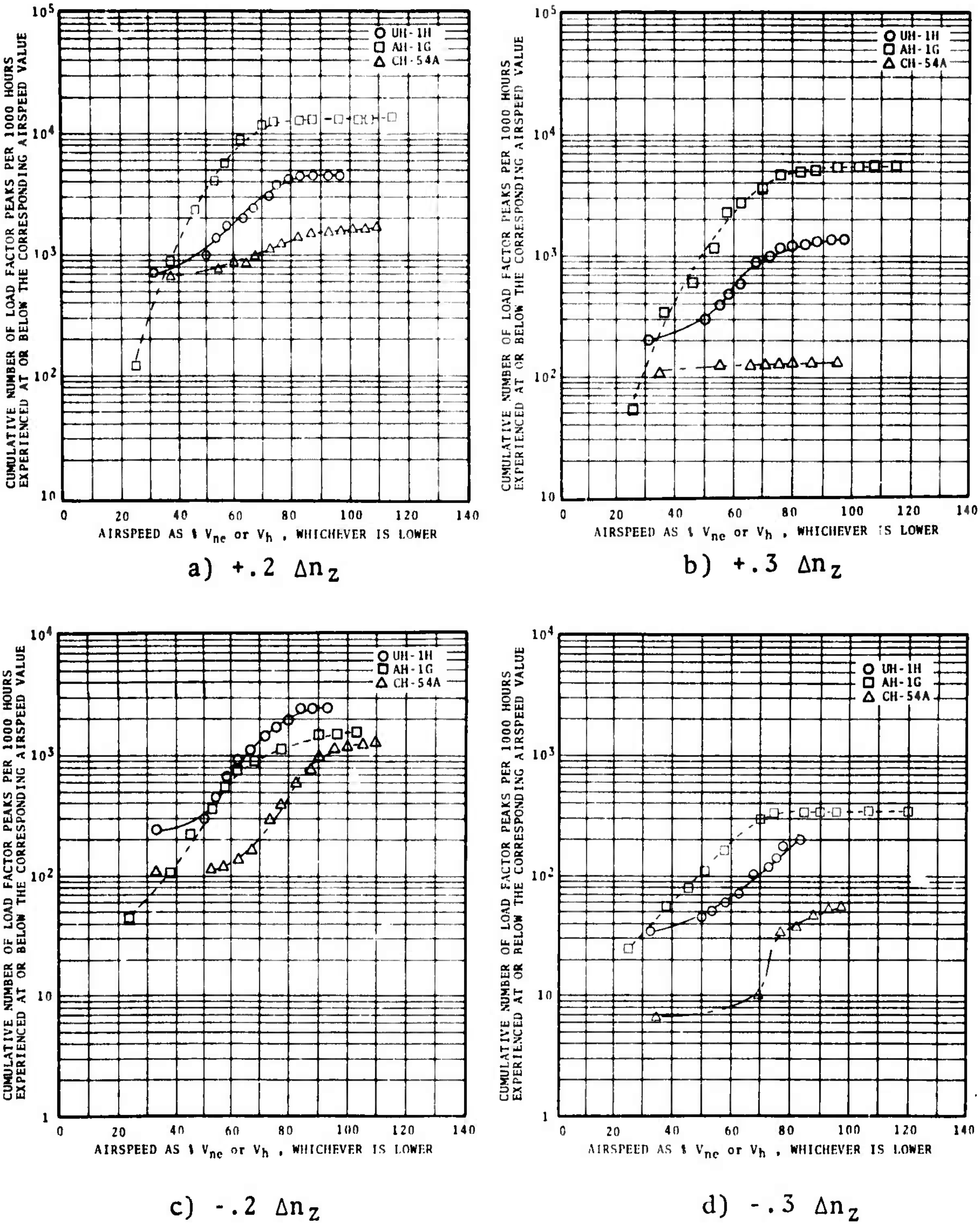
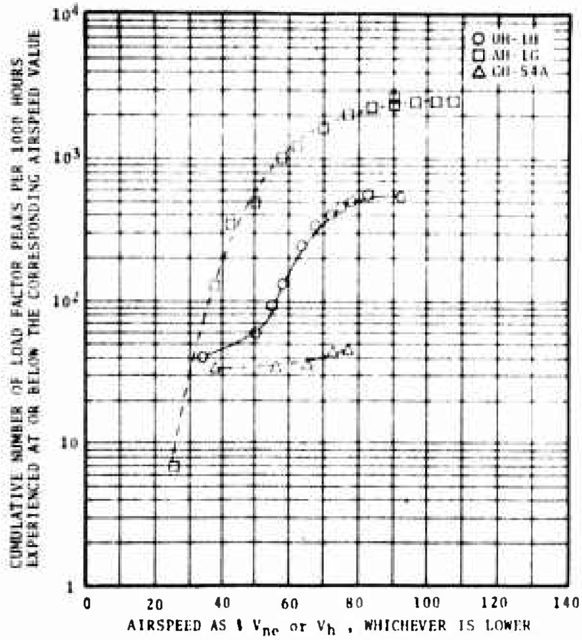
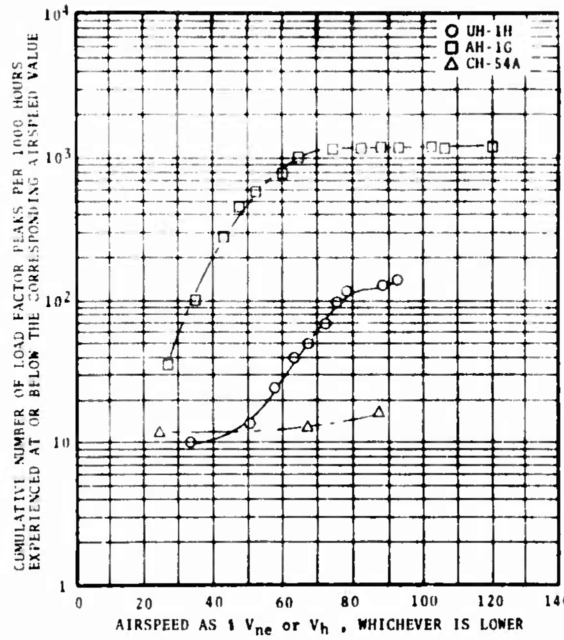


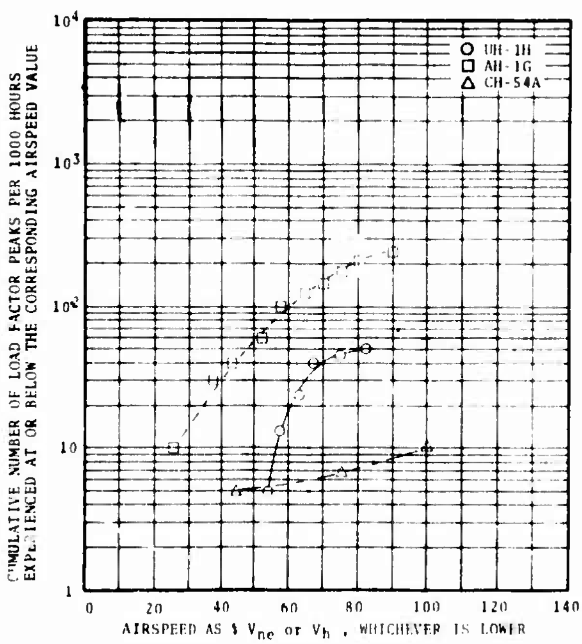
Figure 35. Composite Cumulative Normal Load Factor Frequency Distribution by Airspeed for the UH-1H Compared With Similar Data for the AH-1G and CH-54A Helicopters.



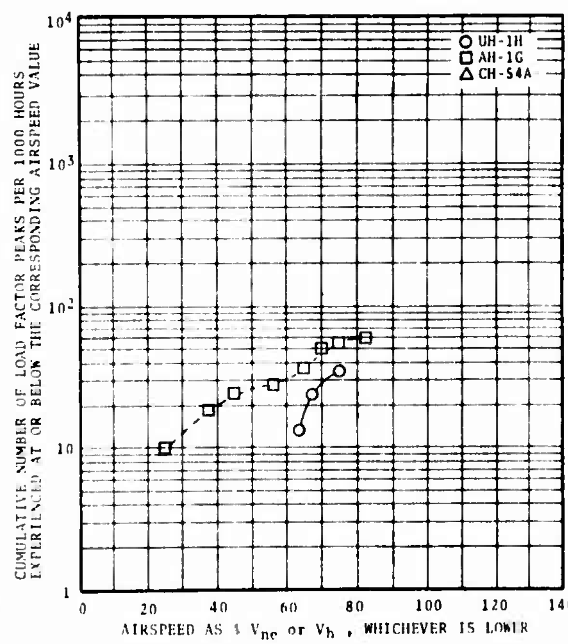
e) $+.4\ \Delta n_z$



f) $+.5\ \Delta n_z$

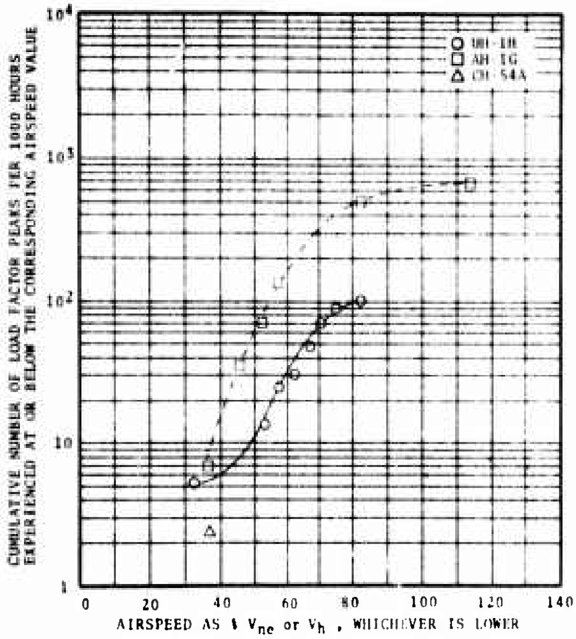


g) $-.4\ \Delta n_z$

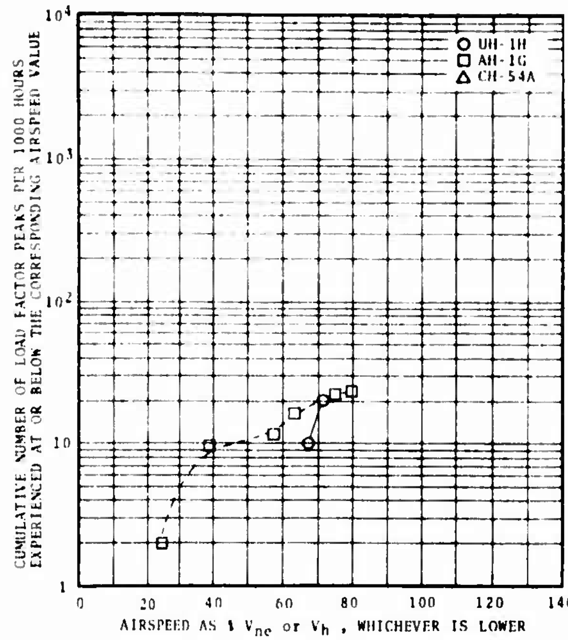


h) $-.5\ \Delta n_z$

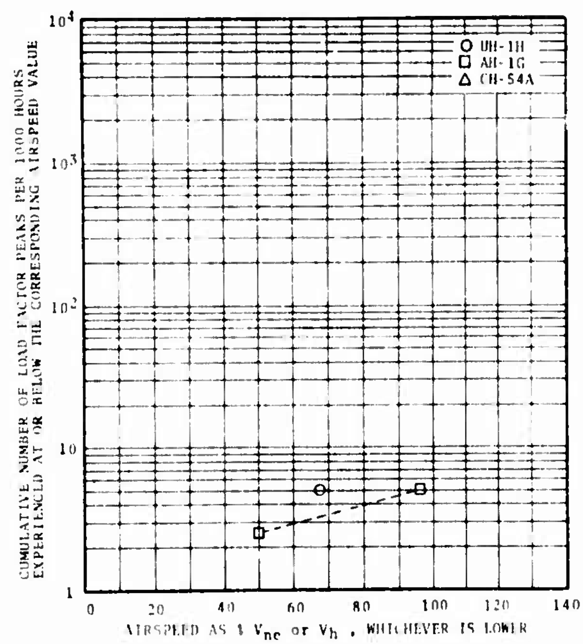
Figure 35 - Continued



i) +.6 Δn_z



j) -.7 Δn_z



k) -.8 Δn_z

Figure 35 - Concluded

Once again, the CH-54A curves do not compare favorably with the UH-1H curves throughout the entire range of negative Δn_z's below -0.2g. The curve for a Δn_z of +.2g compares favorably in shape with the corresponding UH-1H curve; however, the largest number of peaks were encountered in the V_{ne} airspeed range from 60 to 90 percent.

Finally, in Figure 36, the composite cumulative normal load factor frequency distribution for the UH-1H based on data collected during the current program is compared with a similar distribution based on data collected by Bell Helicopter Company. As can be seen, the positive and negative curves based on the Bell data are significantly lower than the data collected during this program. Although some differences might be expected, the apparent differences are most likely due to Bell's using a very low data sampling rate such that many significant Δn_z's were not recorded. The normal load factor data discussed above are listed in Tables XX through XXXV. In addition to the normal load factor data, longitudinal and lateral load factor, n_x and n_y, data are presented in Tables XXIV through XXXIII. The frequency of gust n_z peaks in the coincident ranges of n_z and μ and in the coincident ranges of n_z and airspeed are presented in Tables XX and XXI, respectively. Table XX has mission segment, altitude, and C_T/σ breakdowns, and Table XXI has weight, altitude, and mission segment breakdowns. Maneuver n_z peaks are presented similarly in Tables XXII and XXIII. Tables XXIV, XXV, and XXVI present frequencies of n_x peaks in n_x ranges versus airspeed ranges by weight, versus airspeed ranges by altitude, and versus longitudinal cyclic boost tube load deflection ranges by mission segment, respectively. Tables XXVII, XXVIII, and XXIX present frequencies of n_y peaks in n_y ranges versus airspeed ranges by weight, versus airspeed ranges by altitude, and versus lateral cyclic boost tube load deflection ranges by mission segment, respectively. Tables XXX through XXXV present frequencies of n_x, n_y, and n_z peaks in the coincident ranges of two of these parameters in various combinations.

EQUIVALENT NORMAL OR VERTICAL LOAD FACTORS

By using the procedure discussed in the Data Definitions section, the digitized normal load factor peaks for the UH-1H were converted into equivalent normal load factor peaks, which were then distributed by mission segment in Figure 37. The same trends portrayed in Figure 28 and discussed in the Normal or Vertical Load Factor subsection appear in the Figure 37 plots. Figure 38 presents a diagram of maneuver-induced equivalent normal load factor peaks with respect to tip speed ratio, μ. The higher and lower peaks occurred within the 0.10 to 0.15 range of μ. Further presentations of

equivalent normal load factor data were not made because of the differences in calculation methods discussed below.

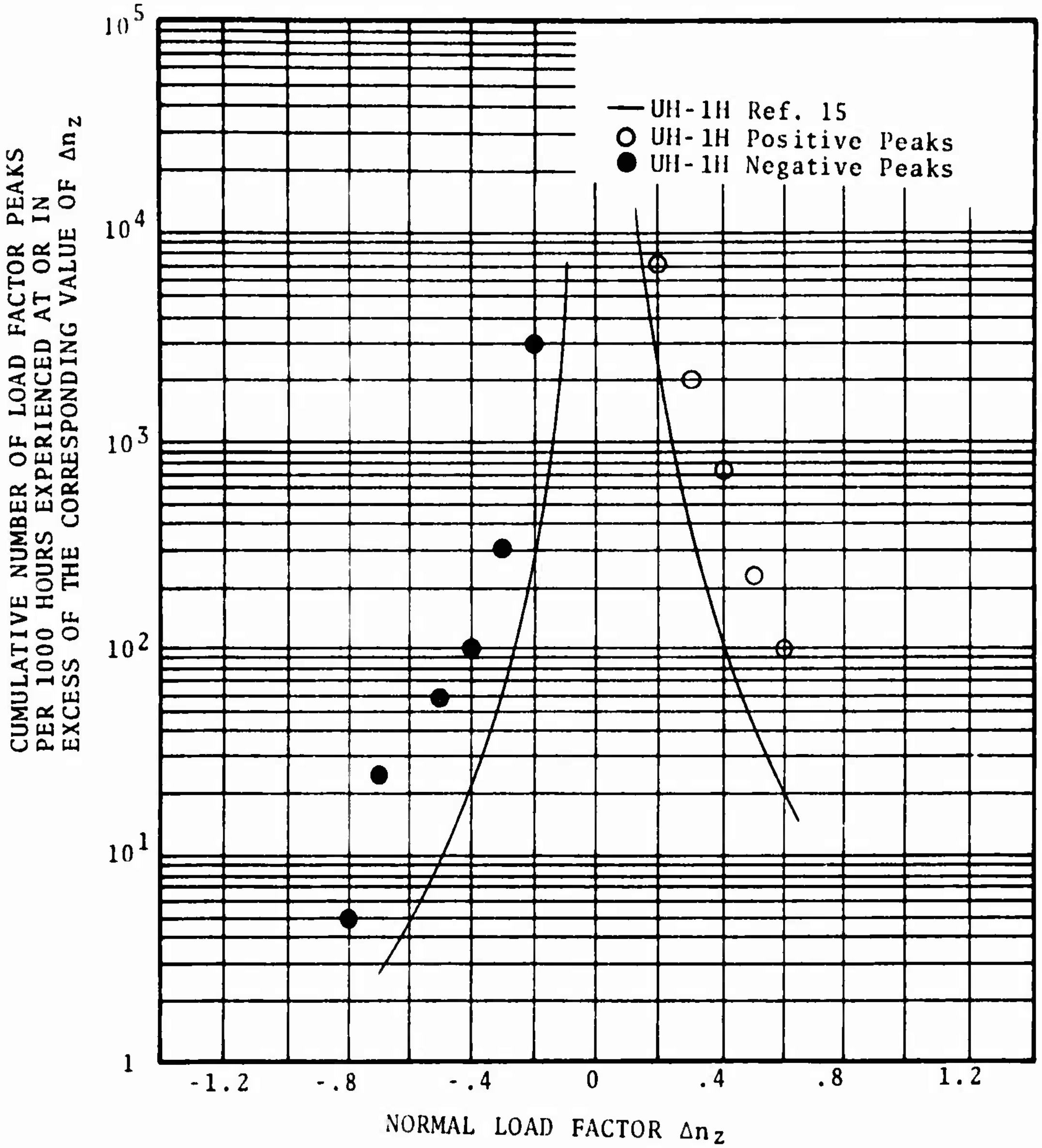


Figure 36. Comparison of Composite Cumulative Normal Load Factor Frequency Distribution for the UH-1H With Similar SEA Data on the UH-1H Obtained by Bell Helicopter Company.

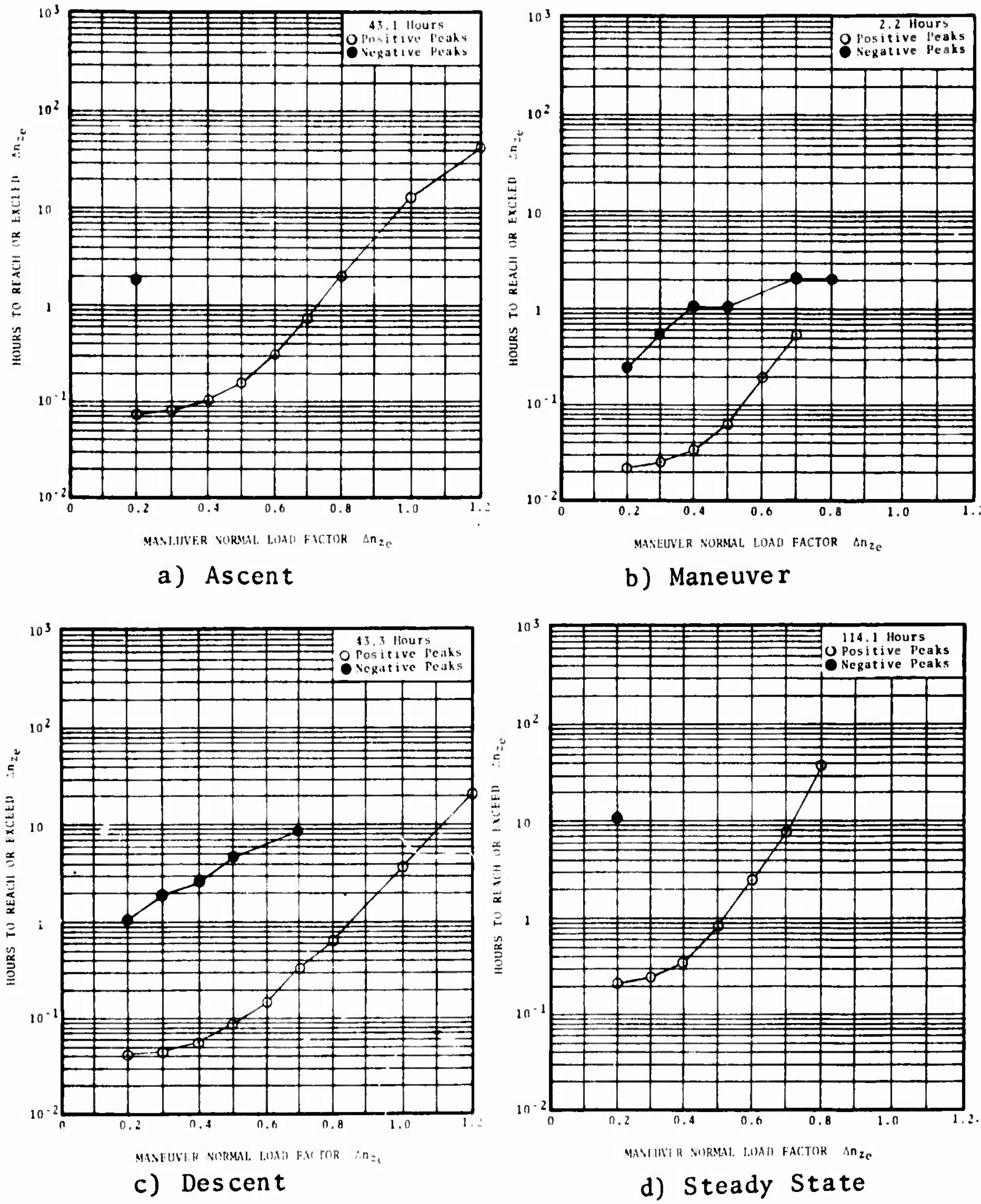
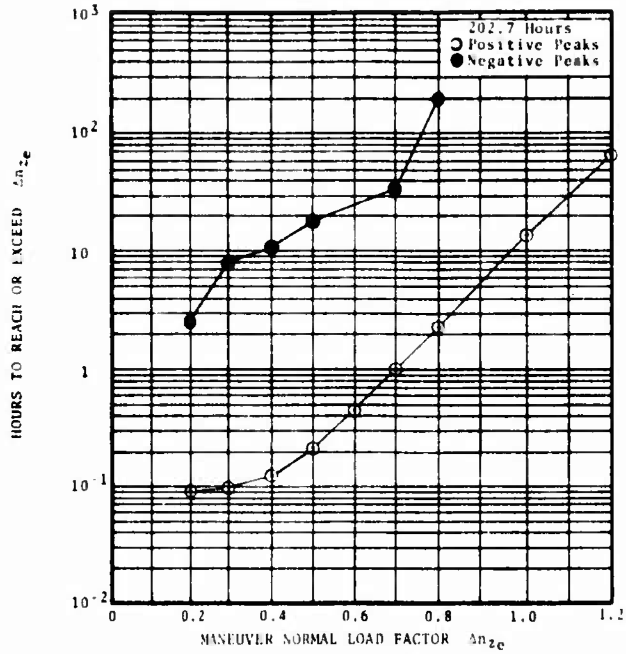


Figure 37. Exceedance Curves for Incremental Equivalent Maneuver Normal Load Factor Peaks by Mission Segment.



e) Composite

Figure 37 - Concluded

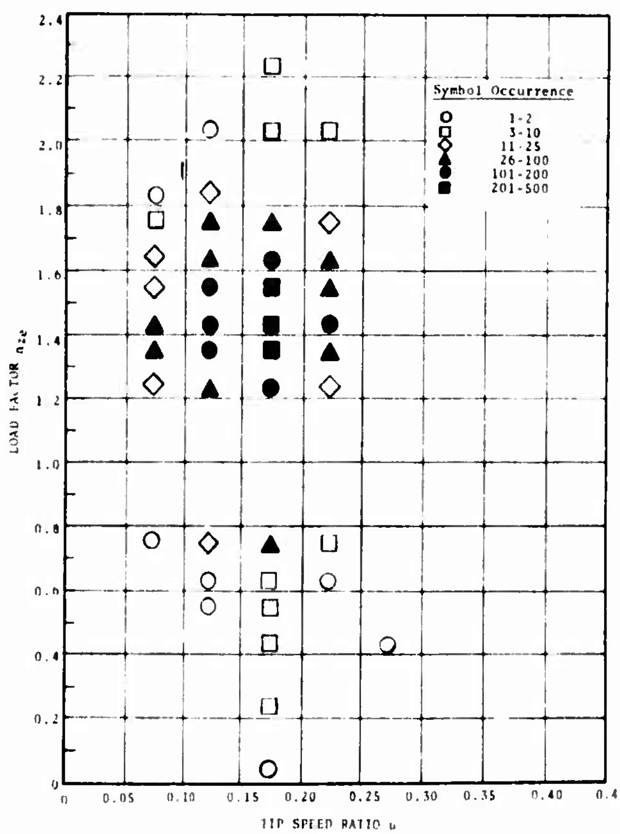


Figure 38. Diagram of Equivalent Maneuver Normal Load Factor Frequency Distribution in Ranges of Rotor Tip Speed Ratio.

Since previous helicopter surveys did not require the presentation of n_{z_e}, the calculated values of n_{z_e} presented in Reference 12 for the AH-1G and CH-54A were obtained from the n_z tabular data. An approximation method had to be used to derive the number of n_{z_e} peaks from the n_z frequency of occurrence data. First the sum of the gust and maneuver n_z peaks was tabulated separately for the gross weight intervals given, and the average value of the upper and lower limits of each gross weight interval was defined as W_i. Then the limits of the vertical load factor intervals were multiplied by the ratio of the instantaneous gross weight to the design maximum gross weight to obtain the equivalent load factor intervals containing the recorded vertical load factor peaks. Then, assuming that the recorded peaks were uniformly distributed throughout the load factor intervals, the data were regrouped into equivalent load factor intervals, with interval limit values corresponding to the vertical load factor interval limits.

The data samples used for these n_{z_e} calculations had all of the n_z peaks in the range of 0.8g to 1.2g removed. Since the maximum design gross weight, W_D, was not exceeded during the AH-1G and CH-54A surveys, there was a downward shift in the distribution of equivalent load factor peaks within the incremental load factor intervals toward the negative values because the ratio of W_i/W_D was less than one. A number of positive peaks were lost by crossing into the threshold region, and all the negative peaks were shifted toward greater negative values. In addition, the negative range adjacent to the threshold had fewer peaks than actually occurred because the threshold data was removed. The resultant n_{z_e} sample is thus skewed and distorted.

In contrast, the equivalent load factor peaks were calculated as the data were processed during this program, and the actual values of n_z and W_i were used instead of range data. In addition, all digitized n_z data within the 0.8g and 1.2g ranges were used.

Since the basic calculation methods differed widely as discussed above, any further presentation or comparison of the n_{z_e} data for the UH-1H would not provide meaningful results. Comparisons will be made in the future as more data are obtained and processed as described above. The existing AH-1G and CH-54A data could be reprocessed to obtain comparable n_{z_e} values. However, since significant conclusions concerning n_{z_e} were not developed in the Reference 12 report, it is doubtful that the reprocessed data would be of value.

CONTROL BOOST TUBE LOADS

In addition to the normal flight parameters recorded during the current program, the axial loads of the longitudinal, lateral, and collective boost tubes were measured and recorded. These loads were recorded to form a data base for the future analysis of control forces to determine whether these forces may be used as an indicator of fatigue damage.

As discussed in the Instrumentation section, the three control boost tubes were strain-gaged to record the axial loads experienced by the tubes. Because of the relatively high frequency of the boost tube loads and the low frequency of the oscillograph recording system, the strain gage signals were filtered so that only the mean strain value of each boost tube was recorded.

Figures 39 through 41 present the cumulative frequency distribution of the longitudinal, lateral, and collective boost tube loads for the UH-1H, respectively. These curves were constructed by cumulatively summing the time spent in each load range, starting with the largest positive or negative load. As seen in Figures 39 and 40, the longitudinal and lateral boost tube loads were independent of gross weight and were very steep; the steepness about the threshold indicates that the boost tube loads were very near the threshold value most of the time. The curves in Figure 41 for the collective boost tube are neither as steep nor as close together as the longitudinal or lateral boost tube curves.

With a mission segment breakdown, Figures 42 through 44 present UH-1H exceedance curves for the longitudinal, lateral, and collective boost tube peaks in terms of "hours to reach or exceed" an incremental boost tube load, respectively. Figure 45 compares the three boost tube loads in terms of the cumulative number of peaks per 1000 hours experienced at or in excess of the corresponding incremental boost tube load. No specific trends are noted in either of these presentations; however, as more data on this and other helicopters are gathered, meaningful trends and comparisons should develop.

To show the relative magnitude of the vibratory and mean loads on the three boost tubes, the 1/revolution and 2/revolution loads for each of the boost tubes under various flight conditions were measured and listed in Table XXXVIII. Included in this table is a descent condition which shows 440 pounds for the maximum vibratory load of the lateral boost tube.

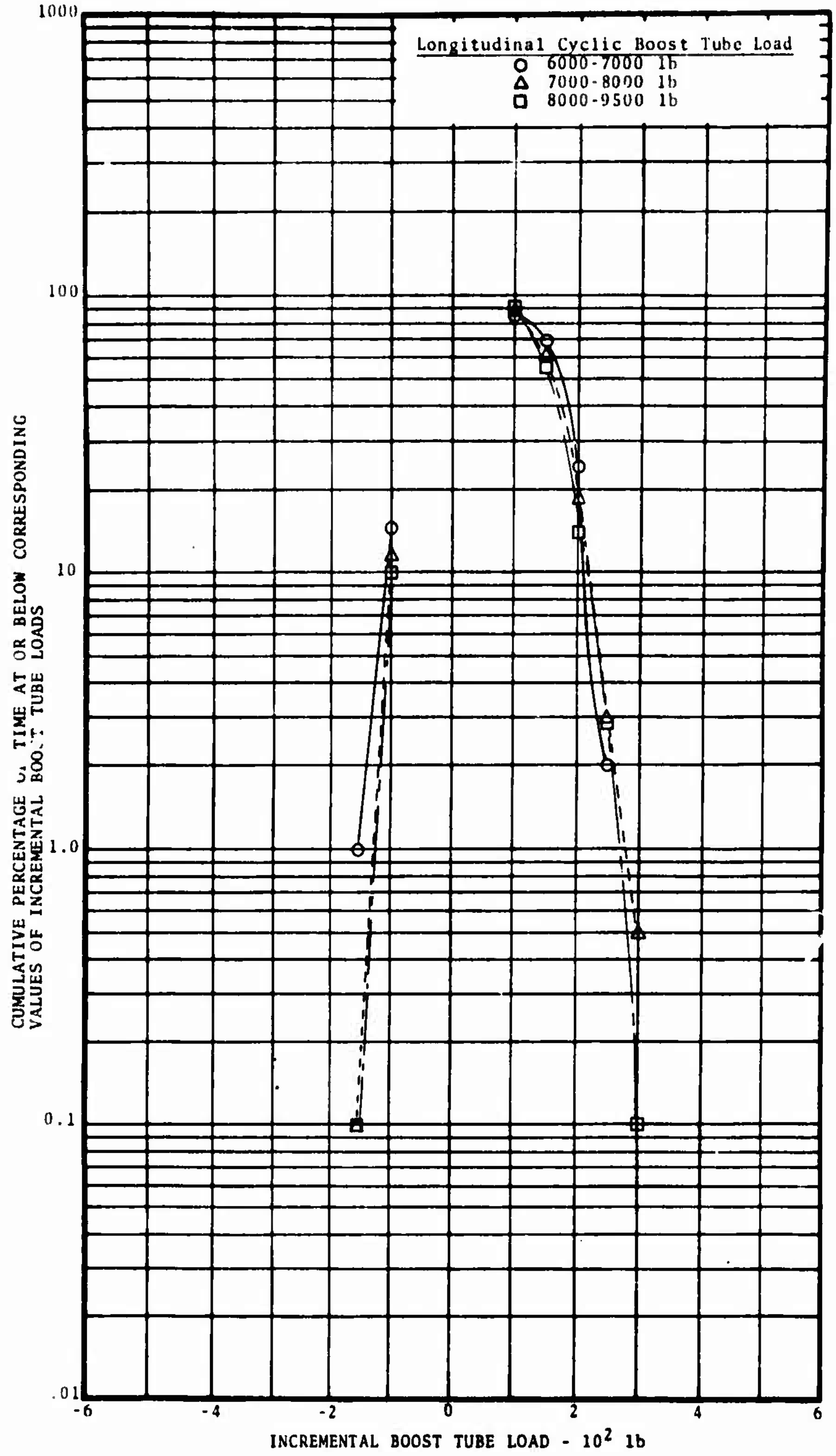


Figure 39. Cumulative Frequency Distribution of Longitudinal Cyclic Boost Tube Load for the UH-1H by Gross Weight.

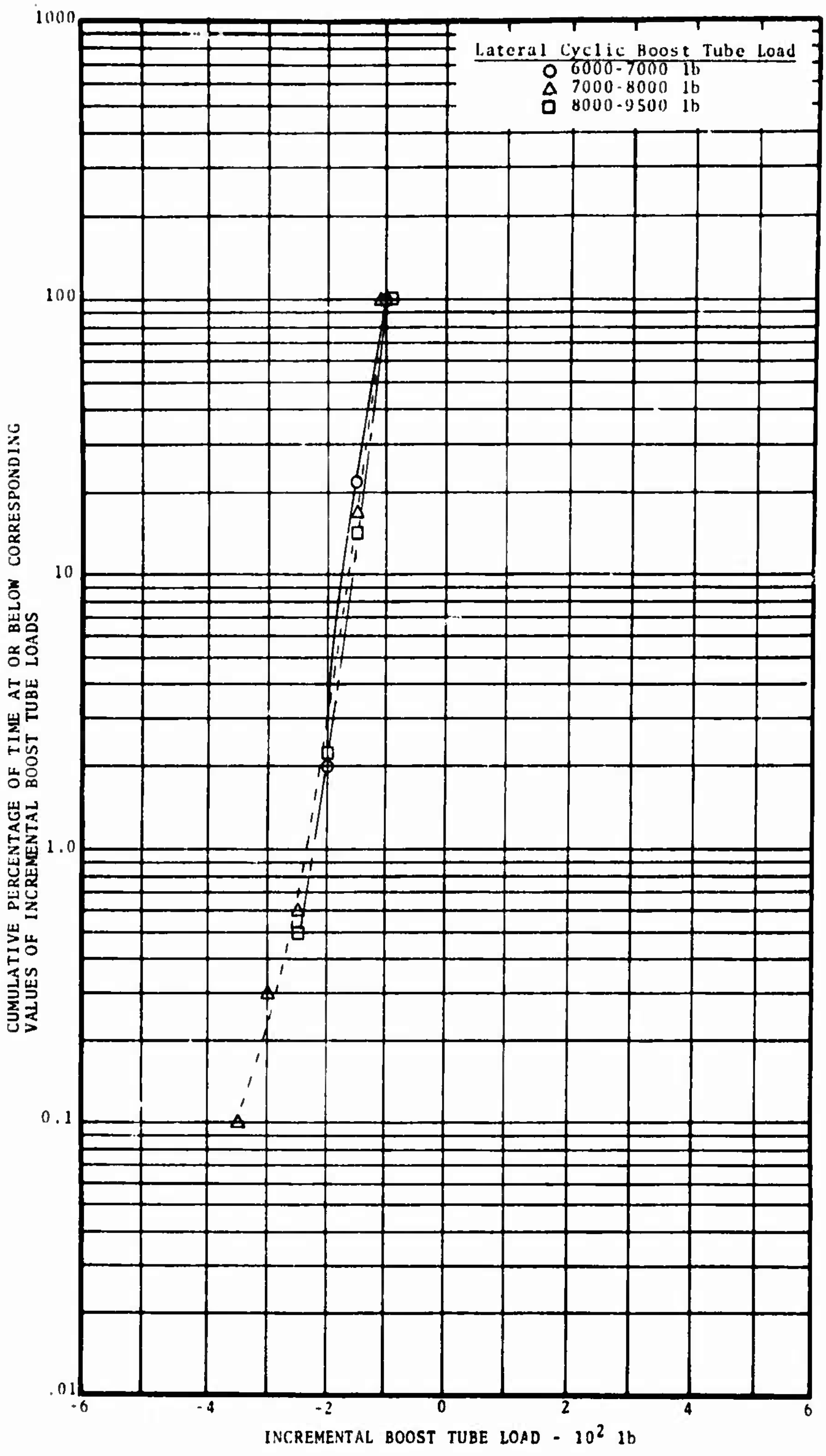


Figure 40. Cumulative Frequency Distribution of Lateral Cyclic Boost Tube Load for the UH-1H by Gross Weight.

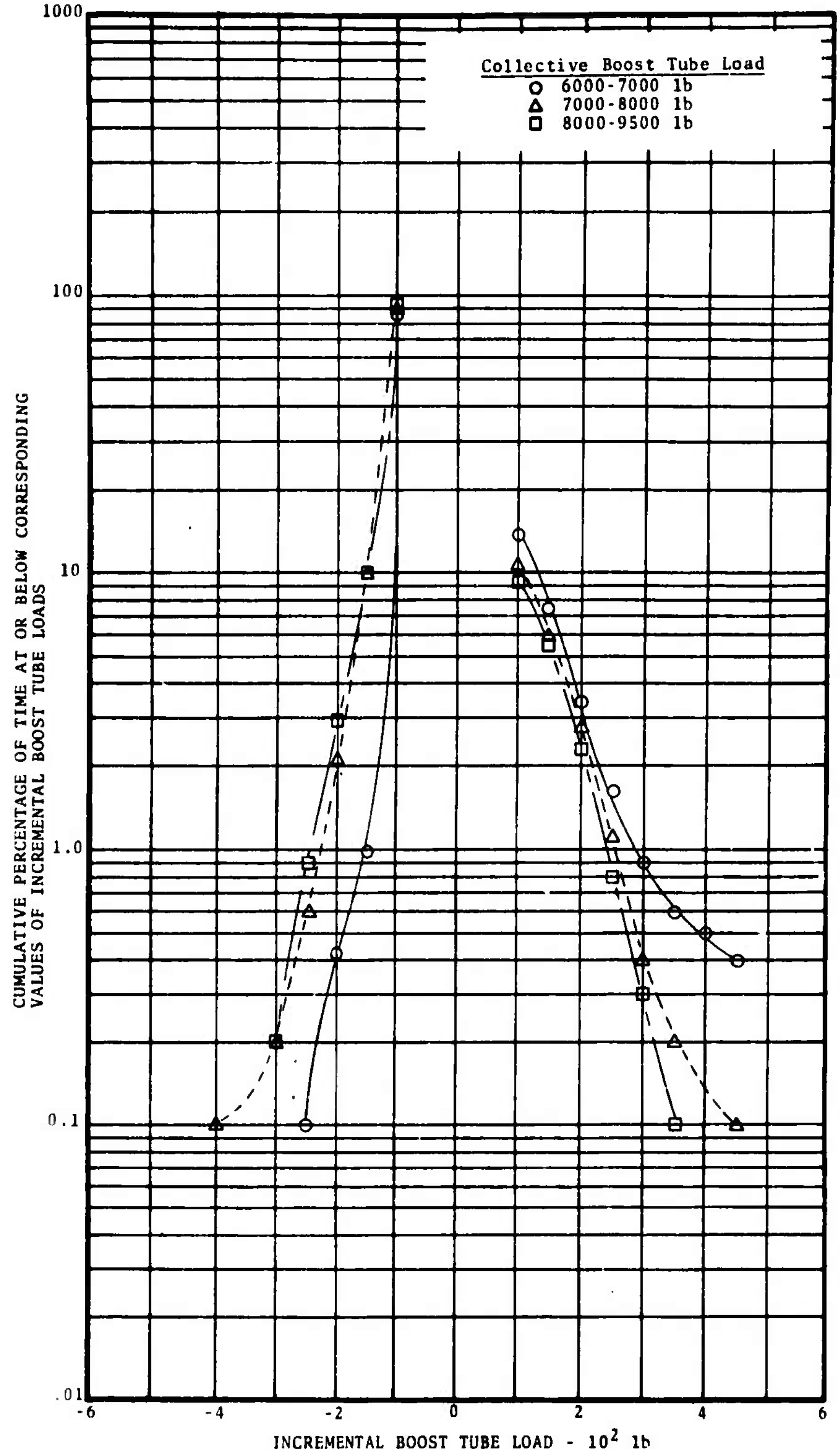


Figure 41. Cumulative Frequency Distribution of Collective Boost Tube Load for the UH-1H by Gross Weight.

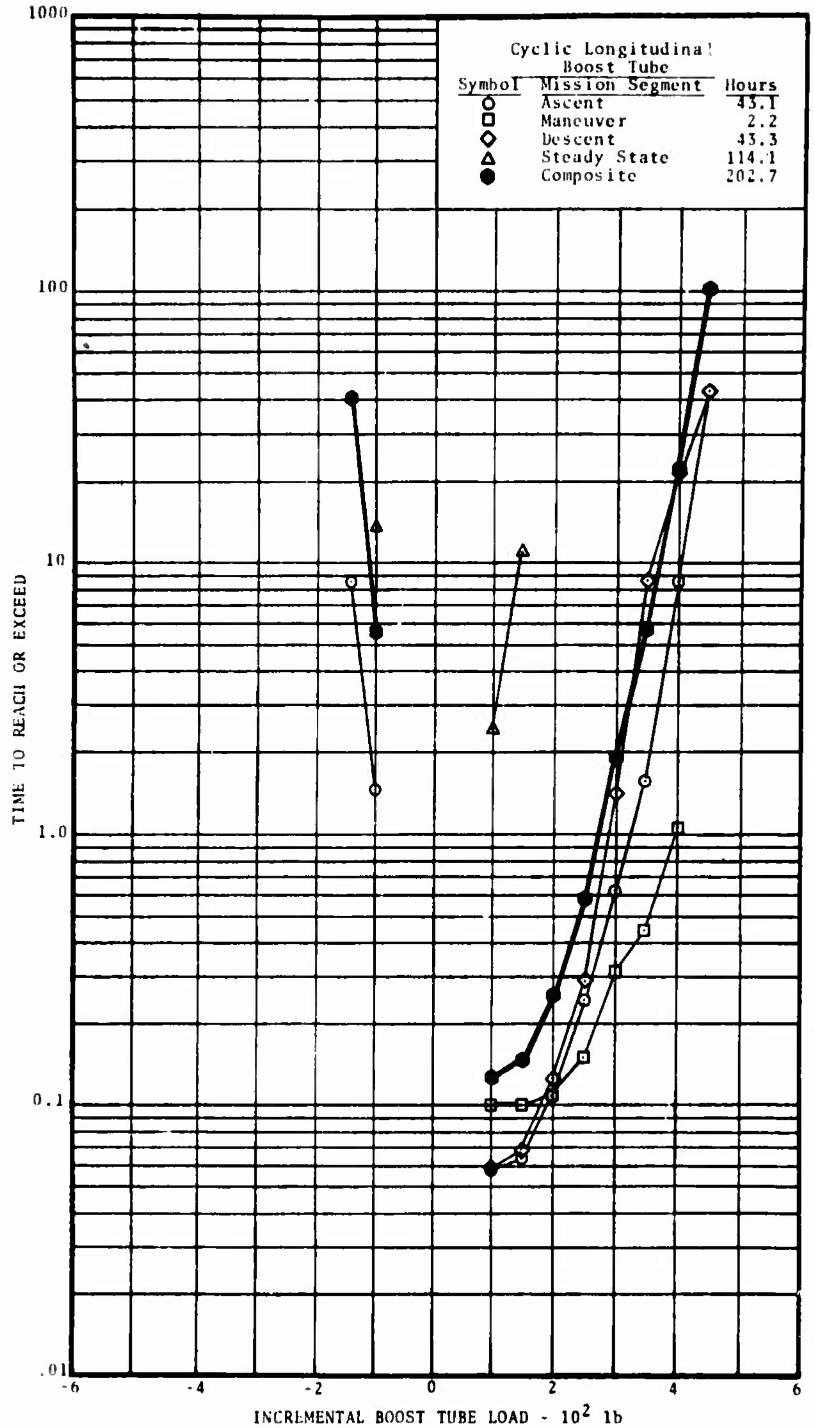


Figure 42. Exceedance Curve for Incremental Longitudinal Cyclic Boost Tube Loads by Mission Segment.

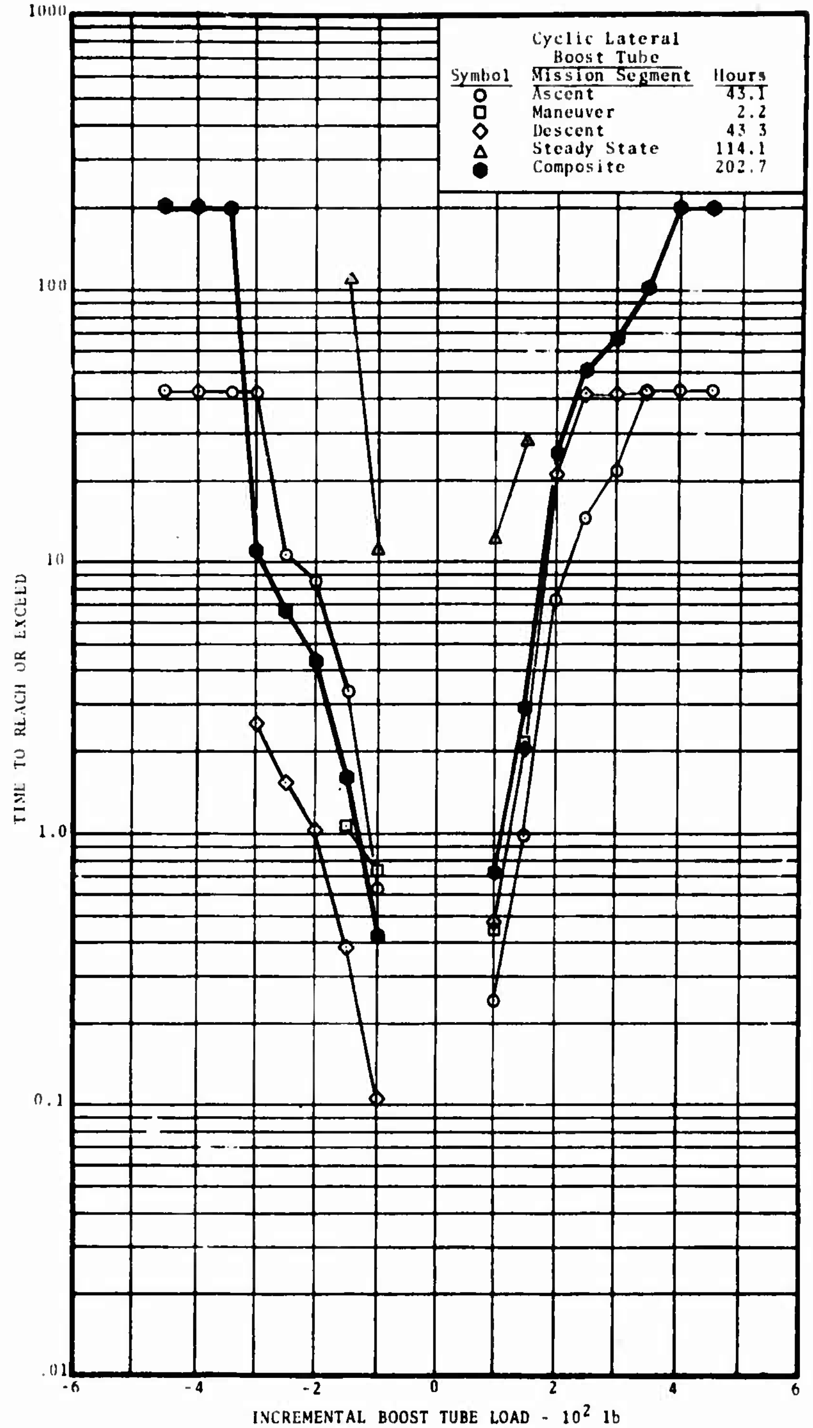


Figure 43. Exceedance Curve for Incremental Lateral Cyclic Boost Tube Loads by Mission Segment.

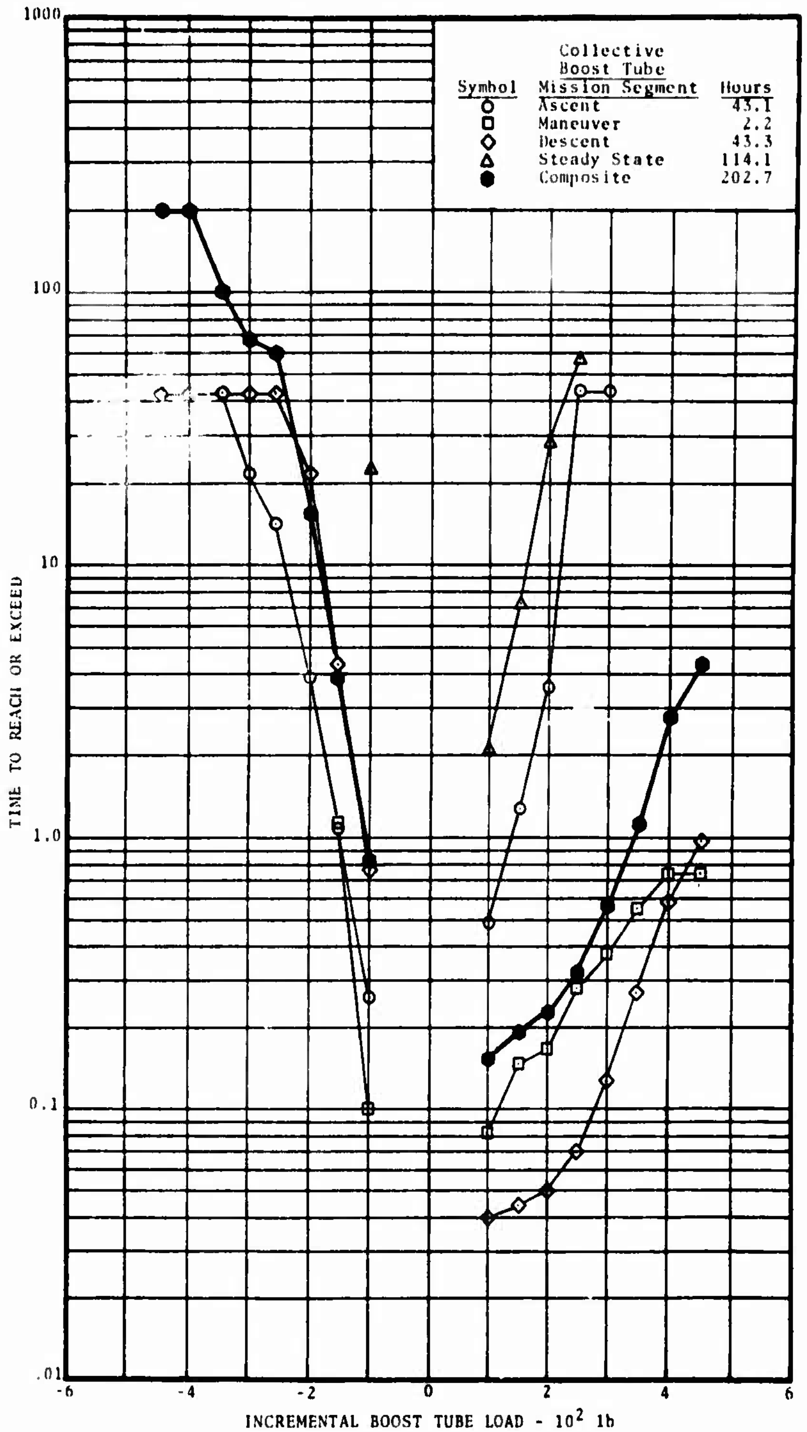


Figure 44. Exceedance Curve for Incremental Collective Boost Tube Loads by Mission Segment.

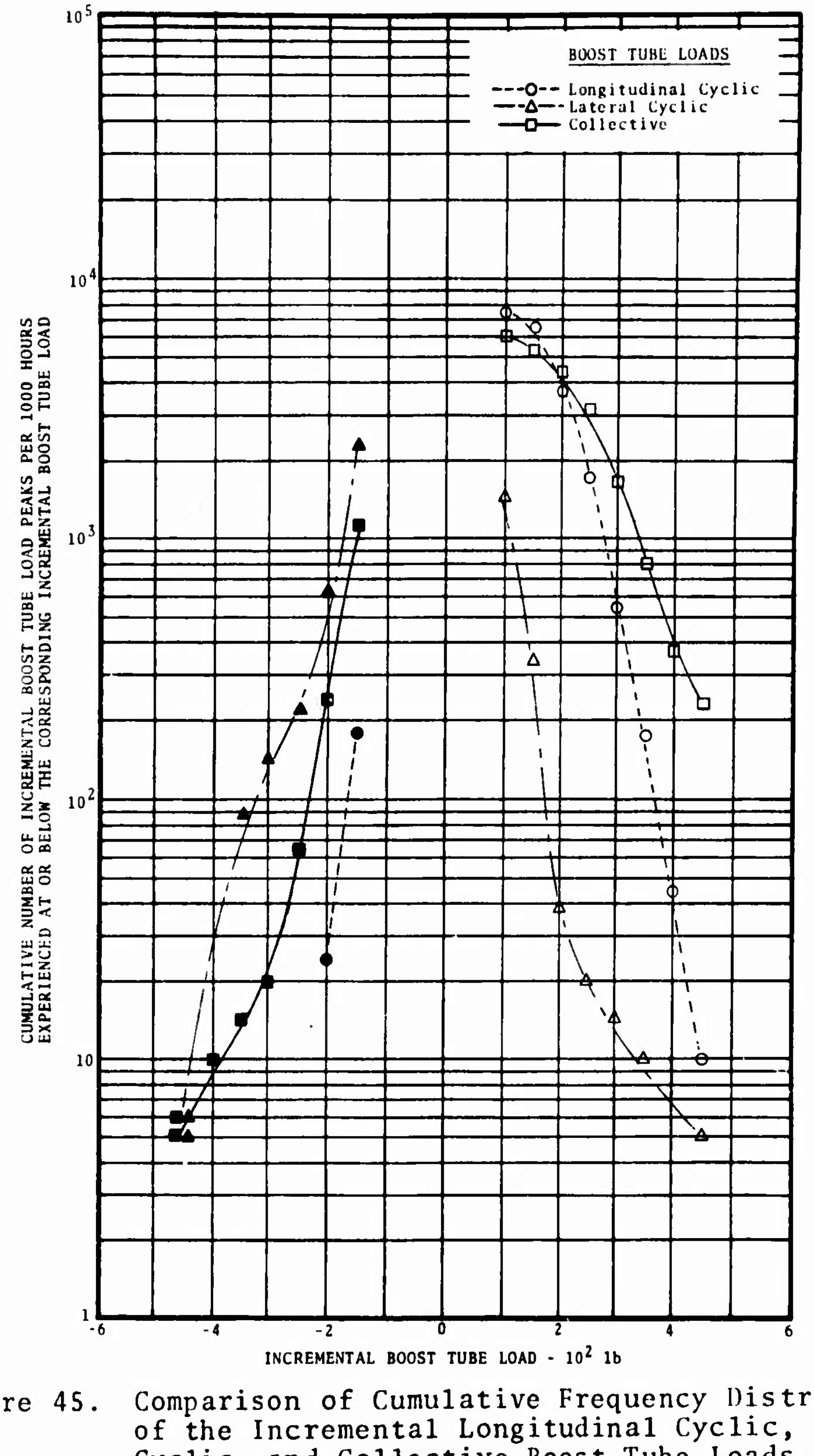


Figure 45. Comparison of Cumulative Frequency Distributions of the Incremental Longitudinal Cyclic, Lateral Cyclic, and Collective Boost Tube Loads.

Tables VIII, IX, and XIII through XIX list the above data in bivariant and trivariant relationships.

ESTABLISHING A FLIGHT SPECTRUM

The preceding analysis of the operational usage data of the UH-1H established the composite mission flown during this program and further outlined the operation of this and similar class helicopters. Since the mission to which a helicopter is assigned plays such a key role in defining the operational usage and since various components of a helicopter will be sensitive to different portions of the operational flight envelope, several mission-oriented spectra should be defined instead of a single composite spectrum. This approach of defining several spectra will provide a better base for the definition of future fatigue design criteria and will give the fatigue analyst greater confidence in his fatigue analysis.

Further confidence could be achieved by the fatigue analyst if a high probability of success could be assigned to the defined spectra. Since the data acquired during this program are presented in a composite manner, rather than on the flight-by-flight basis into which they were processed, the probability that the composite parameter distributions are representative of any randomly selected UH-1H operating in SEA could be anywhere from 0.10 to 0.90, or possibly even 0.999, depending on the statistical variability associated with the UH-1H data. Because it is desirable to assign a relatively high probability to component fatigue life calculations, the individual probability of any element of the fatigue analysis, such as the operation usage spectrum, must be higher than the desired final probability. Consequently, a technique for defining realistic spectra with the desired probability based on existing usage data should be developed; this technique would modify the existing data processing and presentation procedures. Unfortunately, the modifications required to accomplish this goal are not intuitively obvious. Therefore, the statistical variability of existing operational usage data should be examined on a flight-by-flight, a mission-by-mission, and an aircraft-by-aircraft basis. From this examination, the necessary techniques for data processing and presentation should be defined so that operational usage spectra with the desired probability and realistic fatigue design criteria may be derived.

CONCLUSIONS

On the basis of the operational usage data gathered during the current program and the various comparisons drawn between these and other data, it is concluded that:

1. The most influential factor in defining the operational usage of a helicopter is mission assignment.

2. A much better approximation of helicopter usage could be made by defining a general usage spectrum for either military assault or military nonassault missions.

3. All significant missions to which a particular helicopter is assigned should be surveyed.

4. The UH-1H operation compares favorably with that of similar helicopters having a design gross weight of less than 10,000 pounds and with the CH-54A helicopter, except for normal load factor peak occurrences; such occurrences for the UH-1H are generally greater than those for the CH-54A.

5. Low sampling rates of operational usage data, especially in the measurement of "g" occurrences, may cause significant misinterpretations of the acquired data.

RECOMMENDATIONS

The following recommendations are based upon a study of the data presented in this report, as well as upon those presented in the referenced reports:

1. The number of mission segments should be increased from four to seven to include hover, transition, and autorotation segments. This increase in the number of mission segments will improve the resolution of the data as it relates to operational use.

2. Available operational usage data should be analyzed on a flight-by-flight, a mission-by-mission, and an aircraft-by-aircraft basis to determine the statistical variability of the data and to develop improved data processing and presentation techniques for deriving fatigue design and resubstantiation criteria based on operational usage data.

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APPENDIX

BASIC TABULAR DATA PRESENTATION

Tables VII through XXXVIII present the data collected during the current program.

Two tabular formats present the flight time distributed among the coincident ranges of two or more parameters, and frequency of acceleration peaks and incremental boost tube load peaks distributed among the coincident ranges of other variables. All times shown were rounded to the nearest tenth of a minute. Since in each subtable the total under the time column was computed and then rounded, a total may not agree with the sum of the rounded times in each line. Times between 0 and 0.05 minute were printed as ".0", and times equal to zero were printed as "0.0". Tables having neither points nor time were not printed. Table headings are arranged so that the first-mentioned variable refers to the horizontal ranges at the top of the table and the second-mentioned variable refers to the vertical ranges at the left of the table. Where a third or a fourth variable is given, it is followed by its range in the heading. As an example, the heading "MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000 BY MISSION SEG. ASCENT" indicates the time spent in coincident ranges of altitude and airspeed at a weight between 6000 and 7000 pounds during the ascent mission segment. All printed range values are the lower limits.

TABLE VII. TIME FOR ALTITUDE VERSUS AIRSPEED BY WEIGHT AND MISSION SEGMENT

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000. BY MISSION SEG. ASCENT

	LESS	1000	2000	5000	10000	15000	SUM
LESS		17.2	16.0				33.2
40	.3	9.7	23.9	4.9			38.8
60		3.1	14.7	.8			18.6
65		3.5	19.3	.4			23.2
70		3.2	19.9	.9			24.1
75		1.6	19.8	1.3			22.7
80		1.1	19.9	.6			21.6
85		1.2	12.7	.1			14.0
90		.6	7.1				7.7
95			3.0				3.0
100			1.1				1.1
105							
110							
115							
120							
SUM	.3	41.1	157.4	9.2			207.9

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000. BY MISSION SEG. MANUVR

	LESS	1000	2000	5000	10000	15000	SUM
LESS							
40			1.3				1.3
60			.5				.5
65			1.1				1.1
70			3.2				3.2
75			4.5				4.5
80			3.6				3.6
85			5.0				5.0
90			2.9				2.9
95			2.5				2.5
100			1.4				1.4
105			.2				.2
110							
115							
120							
SUM			26.3				26.3

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000. BY MISSION SEG. DESCNT

	LESS	1000	2000	5000	10000	15000	SUM
LESS	.7	24.7	13.5				38.9
40	.4	15.0	11.1				26.4
60	.1	4.2	6.3	.0			10.6
65	.1	4.8	7.6	.1			12.6
70		5.6	10.2	.0			15.8
75		6.0	27.0	.2			33.1
80		7.0	48.3	1.6			56.8
85		3.2	57.4	4.1			64.7
90		2.1	41.0	8.2			51.4
95		.6	25.9	4.5			30.9
100		.1	10.1				10.2
105		.2	3.4				3.7
110			1.1				1.1
115							
120							
SUM	1.2	73.5	262.7	18.7			356.2

TABLE VII - Continued

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000. BY MISSION SEG. STEADY

	LESS	1000	2000	5000	10000	15000	SUM
LESS		23.7	25.9				49.6
40		.3	.5				.8
60		.1	.9				1.0
65		.0	1.5				1.5
70		.3	4.6				4.9
75		.0	30.5	2.6			33.1
80		.5	73.3	13.1			87.0
85		.9	110.4	68.8			180.2
90		1.6	147.8	32.4			181.8
95		.2	62.8	6.7			69.6
100		.1	11.9	1.3			13.4
105		.1	2.4				2.5
110							
115							
120							
SUM		28.0	472.5	124.9			625.3

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 6000. BY MISSION SEG. SUM

	LESS	1000	2000	5000	10000	15000	SUM
LESS	.7	65.6	55.4				121.7
40	.7	25.0	36.8	4.9			67.3
60	.1	7.4	22.4	.9			30.7
65	.1	8.4	29.4	.5			38.4
70		9.1	38.0	.9			48.0
75		7.6	81.7	4.1			93.4
80		8.6	145.0	15.3			168.9
85		5.3	185.5	73.1			263.8
90		4.4	198.8	40.6			243.8
95		.8	94.2	11.1			106.1
100		.2	24.5	1.3			26.0
105		.4	6.0				6.4
110			1.1				1.1
115							
120							
SUM	1.5	142.6	918.8	152.8			1215.7

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 7000. BY MISSION SEG. ASCENT

	LESS	1000	2000	5000	10000	15000	SUM
LESS	5.6	90.3	63.5	.1			159.5
40	1.9	61.1	135.3	3.5	1.9		203.7
60	.3	21.9	100.1	1.1			123.3
65	.1	26.0	106.4	5.3			137.8
70	.0	21.0	111.5	4.2			136.7
75	.1	17.5	103.1	3.2			123.9
80	.1	11.1	89.8	3.8			104.7
85	.2	7.0	82.0	5.6			94.8
90	.3	3.0	45.9	.6			49.7
95	.3	2.6	20.2	.2			23.3
100	.2	1.0	7.5				8.7
105		2.0	1.8				3.8
110		.5	.2				.6
115		.0					.0
120							
SUM	9.1	265.0	867.2	27.5	1.9		1170.8

TABLE VII - Continued

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 7000, BY MISSION SEG. MANUVR

	LESS	1000	2000	5000	10000	15000	SUM
LESS							
40			.7				.7
60			.6				.6
65			2.7				2.7
70			2.9				2.9
75			4.4				4.4
80			6.6				6.6
85			10.2				10.2
90			9.3				9.3
95		4.0	2.7				6.7
100		3.5	.4				3.9
105		3.3	.2				3.4
110		1.0					1.0
115							
120							
SUM		11.8	40.6				52.4

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 7000, BY MISSION [illegible]NT

	LESS	1000	2000	5000	10000	15000	SUM
LESS	8.3	98.0	46.7				153.0
40	2.9	71.7	45.1		.4		120.0
60	.5	20.4	25.4	.2	.1		46.6
65	.0	18.9	32.4	.7	.9		53.0
70	.1	21.3	51.1	1.5	.5		74.5
75	.3	24.9	74.7	2.9			102.8
80		23.1	131.3	5.6	.3		160.3
85	.2	20.7	172.7	4.6	.6		198.7
90	.0	15.4	154.5	1.8			171.7
95		6.1	88.5	1.5			96.1
100	.0	1.8	37.0	.2			39.0
105		.5	11.6				12.2
110		.6	2.3				3.0
115		.0	.7				.7
120							
SUM	12.2	323.4	874.0	19.1	2.8		1231.5

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 7000, BY MISSION SEG. STEADY

	LESS	1000	2000	5000	10000	15000	SUM
LESS	15.7	170.7	85.2				271.6
40		.3	11.3	.3			11.9
60		.2	11.9	.3			12.4
65			25.0	.5			25.5
70		.6	50.3	.8			51.7
75		2.4	155.8	6.8	.3		165.3
80		6.4	441.9	20.6	4.1		473.1
85		16.8	723.8	28.4	1.7		770.8
90	.3	8.5	915.7	27.7	1.2		953.4
95	4.8	2.8	408.2	12.3	1.2		429.3
100	4.1	.1	108.1	4.4			116.6
105		.1	16.2	.0			16.3
110			9.1				9.1
115			.3				.3
120							
SUM	24.9	209.0	2962.9	102.1	8.5		3307.4

TABLE VII - Continued

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 7000. BY MISSION SEG. SUM

	LESS	1000	2000	5000	10000	15000	SUM
LESS	29.6	359.0	195.4	.1			584.1
40	4.7	133.1	192.3	3.9	2.3		336.3
60	.7	42.4	138.1	1.6	.1		182.9
65	.2	44.9	166.4	6.5	.9		219.0
70	.1	42.9	215.8	6.5	.5		265.8
75	.3	44.8	338.1	12.9	.3		396.4
80	.1	40.6	669.7	29.9	4.4		744.7
85	.3	44.5	988.7	38.7	2.3		1074.5
90	.6	26.9	1125.3	30.1	1.2		1184.1
95	5.2	15.6	519.6	13.9	1.2		555.4
100	4.3	6.3	153.0	4.6			168.3
105		5.9	29.8	.0			35.8
110		2.1	11.6				13.6
115		.1	1.0				1.1
120							
SUM	46.2	809.3	4744.7	148.7	13.1		5762.1

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 8000. BY MISSION SEG. ASCENT

	LESS	1000	2000	5000	10000	15000	SUM
LESS	10.7	77.3	66.3	.2			154.4
40	3.3	59.9	155.5	4.2			222.9
60	1.5	29.3	115.4	3.3			149.5
65	.5	28.6	118.3	8.7			156.1
70	.1	25.7	125.0	2.3			153.2
75	.2	15.8	104.5	5.9			126.4
80	.1	13.9	101.7	4.6	.1		120.5
85	.0	9.8	56.6	1.8			68.2
90		5.6	36.0	.5			42.1
95		1.9	9.9	1.2			13.0
100		.7	1.6	.4			2.7
105		.1	.1				.2
110		.1					.1
115							
120							
SUM	16.6	268.6	891.0	33.0	.1		1209.2

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 8000. BY MISSION SEG. MANUVR

	LESS	1000	2000	5000	10000	15000	SUM
LESS							
40		.5	.4				.9
60		.2	2.3				2.5
65		.1	2.3				2.4
70		.1	4.1				4.2
75		.1	3.4				3.5
80		.7	7.9				8.6
85		1.6	11.2				12.7
90		.7	12.0				12.7
95		.1	3.4				3.5
100		.5	.2				.8
105		2.1					2.1
110		1.1					1.1
115		.5					.5
120							
SUM		8.3	47.2				55.5

TABLE VII - Continued

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 8000. BY MISSION SEG. DESCNT

	LESS	1000	2000	5000	10000	15000	SUM
LESS	9.7	74.0	35.3				119.0
40	2.0	50.4	42.8	.4			95.6
60	.3	17.6	18.8	.2			37.0
65	.1	16.1	23.1	.2			39.5
70	.1	14.4	33.7	.4			48.6
75		18.3	69.5	.6			88.4
80		17.2	102.5	2.0			121.7
85		19.2	138.8	6.6			164.7
90		14.1	137.4	10.8	.2		162.5
95		7.1	90.0	4.0	.1		101.2
100		1.2	22.1	.6			24.0
105		.7	3.1	.1			3.8
110		.1	1.0	.2			1.3
115			.1				.1
120							
SUM	12.1	250.6	718.2	26.1	.3		1007.2

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 8000. BY MISSION SEG. STEADY

	LESS	1000	2000	5000	10000	15000	SUM
LESS	17.2	108.5	91.4				217.1
40		.4	6.4				6.8
60		.2	7.1				7.3
65		.4	18.9	1.5			20.8
70		.1	44.0	1.4			45.4
75		1.3	136.0	4.5			141.8
80		6.3	396.8	17.7	.7		421.5
85		9.6	770.8	56.6	8.3		845.4
90		11.9	712.5	31.8	2.4		758.5
95		4.2	353.0	12.2			369.3
100		2.7	67.9	.5			71.1
105			6.9				6.9
110			.4				.4
115							
120							
SUM	17.2	145.5	2612.1	126.2	11.4		2912.3

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT 8000. BY MISSION SEG. SUM

	LESS	1000	2000	5000	10000	15000	SUM
LESS	37.5	259.7	193.0	.2			490.4
40	5.3	111.2	205.1	4.5			326.1
60	1.8	47.3	143.6	3.5			196.3
65	.6	45.1	162.7	10.4			218.8
70	.2	40.3	206.8	4.0			251.4
75	.2	35.5	313.3	11.1			360.2
80	.1	38.1	609.0	24.3	.8		672.3
85	.0	40.2	977.4	65.0	8.3		1091.0
90		32.3	897.9	43.2	2.6		975.8
95		13.2	456.3	17.3	.1		487.0
100		5.2	91.8	1.5			98.6
105		2.9	10.1	.1			13.0
110		1.3	1.4	.2			2.8
115		.5	.1				.6
120							
SUM	45.9	672.9	4268.4	185.3	11.8		5184.3

TABLE VII - Concluded

MINUTES FOR ALTITUDE VS AIRSPEED BY WEIGHT SUM, BY MISSION SEG. SUM

	LESS	1000	2000	5000	10000	15000	SUM
LESS	67.9	684.4	443.8	.2			1196.3
40	10.7	269.3	434.2	13.3	2.3		729.7
60	2.6	97.1	304.1	6.0	.1		409.9
65	.9	98.4	358.5	17.4	.9		476.1
70	.4	92.3	460.6	11.5	.5		565.2
75	.6	87.9	733.1	28.1	.3		850.0
80	.2	87.3	1423.7	69.5	5.2		1585.9
85	.4	90.1	2151.6	176.7	10.6		2429.4
90	.6	63.5	2222.0	113.9	3.7		2403.7
95	5.2	29.6	1070.1	42.4	1.3		1148.5
100	4.3	11.8	269.3	7.5			292.9
105		9.1	45.9	.1			55.2
110		3.3	14.0	.2			17.5
115		.6	1.1				1.7
120							
SUM	93.7	1624.8	9932.0	486.7	24.9		12162.1

TABLE VIII. TIME FOR LONGITUDINAL CYCLIC BOOST TUBE STEADY LOAD VERSUS COLLECTIVE BOOST TUBE STEADY LOAD BY MISSION SEGMENT

MINUTES FOR CY-LNG VS COLL. BY MISS. SEG. ASCENT

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450									.1									.1
-400									2.1	1.3	.9							4.2
-350									.3	.4	.9							1.5
-300									1.5	1.8	1.3	.5						5.1
-250									5.6	10.9	8.6	.1	.1					25.3
-200								.1	22.5	54.5	45.1	16.3	.5					139.0
-150								.9	62.0	123.7	117.0	117.8	14.7	1.7	.0			437.8
-100								2.0	253.8	684.3	713.5	243.2	32.6	8.0	.2			1937.6
100									1.9	6.6	14.1	1.9		.4				24.9
150									.6	.3	9.1	.0						10.1
200									.1	.9	1.4							2.3
250											.1							.1
300																		
350																		
400																		
450																		
SUM								2.9	350.3	884.8	911.9	379.8	47.9	10.1	.2			2587.9

MINUTES FOR CY-LNG VS COLL. BY MISS. SEG. MANUVR

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250											.2	.7						1.0
-200										.7	.1	.9	.5					2.3
-150										.9	3.3	4.4	4.4	.1				13.1
-100									.5	8.2	53.2	36.9	10.5	2.2				111.5
100										.4	2.3	.1						2.8
150										.1	.9	.2						1.2
200										.1	1.1	.2	.1					1.4
250											.1	.1						.1
300											.1	.0						.1
350																		
400											.1	.0	.1					.2
450											.2		.2					.4
SUM									.5	10.4	61.6	43.5	15.8	2.2				134.2

TABLE VIII - Concluded

MINUTES FOR CY-LNG VS COLL. BY MISS. SEG. DESCNT

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250									.3	.1	2.7	1.5						4.6
-200									4.7	.7	.7	.4	.1					6.5
-150									19.5	11.6	7.5	1.8	.7					41.1
-100							.3	2.4	248.9	460.3	502.2	198.2	30.8	1.8				1444.8
100								.1	77.7	172.9	150.9	43.3	4.2	.8		.0		449.8
150									64.6	146.3	108.3	20.7	1.9	.2				342.0
200									35.0	82.3	55.3	11.4	2.7					186.7
250									12.2	35.7	16.9	8.0	1.8	.1				74.6
300									3.2	10.1	8.0	3.3	.4					25.1
350									.4	4.7	2.5	.5	.2	.1				8.3
400									.2	2.0	.7	.3	.2					3.4
450									.5	.9	2.9	3.0	.6					8.0
SUM							.3	2.5	467.0	927.6	858.6	292.3	43.6	3.0		.0		2594.9

MINUTES FOR CY-LNG VS COLL. BY MISS. SEG. STEADY

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300									.3		3.1	3.4						6.9
-250									1.6	.7	23.1	6.0						31.4
-200									14.5	8.9	48.4	17.6	1.0					90.4
-150								.4	78.1	113.8	145.6	49.6	5.5					392.9
-100							.1	4.6	532.0	1704.7	2748.6	994.2	198.1	17.7	.2			6200.2
100									5.6	20.2	40.5	8.8	.7					75.7
150									1.7	7.1	30.7	.2	.2					39.9
200									3.0	2.0	1.7	.0						6.8
250										.8								.8
300																		
350																		
400																		
450																		
SUM							.1	5.0	636.8	1858.3	3041.5	1079.9	205.5	17.7	.2			6845.0

MINUTES FOR CY-LNG VS COLL. BY MISS. SEG. SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450									.1									.1
-400									2.1	1.3	.9							4.2
-350									.3	.4	.9							1.5
-300									1.8	1.8	4.4	6.0						11.9
-250									7.4	11.7	34.6	8.4	.1					62.2
-200								.1	41.6	64.8	94.4	35.2	2.1					238.2
-150								1.2	159.6	250.0	273.4	173.6	25.3	1.8	.0			884.9
-100							.4	9.0	1035.2	2857.5	[illegible]	1472.5	272.0	29.7	.4			9694.1
100								.1	[illegible]	200.2	[illegible]	54.1	4.9	1.2		.0		553.2
150									66.9	153.9	149.0	21.0	2.1	.2				393.1
200									38.1	85.3	59.5	11.6	2.8					197.2
250									12.2	36.5	17.0	8.1	1.8	.1				75.7
300									3.2	10.1	8.1	3.4	.4					25.3
350									.4	4.7	2.5	.5	.2	.1				8.3
400									.2	2.0	.8	.3	.3					3.6
450									.5	.9	3.1	3.0	.8					8.4
SUM							.4	10.4	1454.6	3681.1	4873.6	1795.6	312.8	33.0	.4	.0		12167.1

TABLE IX. TIME FOR LATERAL CYCLIC BOOST TUBE STEADY LOAD VERSUS COLLECTIVE BOOST TUBE STEADY LOAD BY MISSION SEGMENT

MINUTES FOR CY-LAT VS COLL. BY MISS. SEG. ASCENT

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450									.1									.1
-400									4.2									4.2
-350									1.5									1.5
-300									5.1									5.1
-250								1.8	23.5									25.3
-200							.5	4.4	134.0									139.0
-150							1.6	28.1	408.1	.0								437.8
-100			.3	.9		4.9	32.5	236.0	1662.5	.4								1937.6
100							1.2	7.3	16.4									24.9
150							.1	.4	9.6									10.1
200								.2	2.1									2.3
250									.1									.1
300																		
350																		
400																		
450																		
SUM			.3	.9		4.9	35.9	278.2	2267.3	.5								2587.9

MINUTES FOR CY-LAT VS COLL. BY MISS. SEG. MANUVR

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250									1.0									1.0
-200								.5	1.8									2.3
-150							.2	1.2	11.7									13.1
-100							.4	6.7	104.4									111.5
100								.5	2.3									2.8
150							.1	.7	.4									1.2
200							.2	.6	.6									1.4
250								.0	.1									.1
300								.1										.1
350																		
400						.0	.1	.0										.2
450						.0	.3	.0										.4
SUM						.1	1.4	10.5	122.2									134.2

MINUTES FOR CY-LAT VS COLL. BY MISS. SEG. DESCNT

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250									4.6									4.6
-200							.2	1.2	5.1									6.5
-150						.1	.9	5.0	35.1									41.1
-100			.2	.9	7.5	5.0	57.2	320.1	1053.7	.2								1444.8
100			.1	2.3	.7	1.6	28.0	149.2	268.0									449.8
150			.2	.2	.5	1.7	24.2	125.9	189.2									342.0
200				.5	.1	1.2	15.0	78.2	91.8									186.7
250						.6	6.8	33.0	34.2									74.6
300						.3	3.7	10.0	11.3									25.1
350						.1	1.3	3.8	3.1									8.3
400							.4	1.3	1.7									3.4
450						.1	1.7	4.5	1.7									8.0
SUM			.6	3.9	8.8	10.6	139.4	732.1	1699.4	.2								2594.9

MINUTES FOR CY-LAT VS COLL. BY MISS. SEG. STEADY

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300									6.9									6.9
-250							.1	.4	30.9									31.4
-200							.2	1.8	88.4									90.4
-150							1.6	18.3	373.1									392.9
-100				2.4	9.3	18.5	62.5	662.3	5444.9	.3	.1							6200.2
100						.1	1.3	15.8	58.6									75.7
150						.1	.2	13.9	25.7									39.9
200								.3	6.5									6.8
250									.8									.8
300																		
350																		
400																		
450																		
SUM				2.4	9.3	18.7	65.8	712.7	6035.8	.3	.1							6845.0

TABLE IX - Concluded

MINUTES FOR CY-LAT VS COLL. BY MISS. SEG. SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450									.1									.1
-400									4.2									4.2
-350									1.5									1.5
-300									11.9									11.9
-250							.1	2.3	59.9									62.2
-200							.9	8.0	229.3									238.2
-150						.1	4.3	52.5	827.9	.0								884.9
-100			.6	4.2	16.8	28.4	152.6	1225.1	8265.4	.9	.1							9694.1
100			.1	2.3	.7	1.6	30.4	172.8	345.3									553.2
150			.2	.2	.5	1.7	24.6	140.9	224.9									393.1
200				.5	.1	1.2	15.2	79.2	101.0									197.2
250						.6	6.8	33.1	35.2									75.7
300						.3	3.7	10.1	11.3									25.3
350						.1	1.3	3.8	3.1									8.3
400						.0	.5	1.3	1.7									3.6
450						.1	2.0	4.6	1.7									8.4
SUM			.9	7.2	18.1	34.2	242.5	1733.6	10124.6	.9	.1							12162.1

TABLE X. TIME FOR C_T/σ VERSUS μ BY RATE OF CLIMB AND MISSION SEGMENT

MINUTES FOR CT/S VS MU BY RATE OF CLIMB LESS, BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.0					.0
0.15	.1	.3				.3
0.20		.1				.1
0.25		.1	.1			.1
0.30						
SUM	.1	.4	.1			.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB LESS, BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	.9	1.1				2.0
0.15	2.9	11.7				14.6
0.20	.7	3.3				3.9
0.25						
0.30						
SUM	4.5	16.2				20.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB LESS, BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	1.0	1.1				2.1
0.15	3.0	12.0				14.9
0.20	.7	3.3				4.0
0.25		.1	.1			.1
0.30						
SUM	4.6	16.6	.1			21.3

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -2100, BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10						
0.15						
0.20	.2	.1				.3
0.25						
0.30						
SUM	.2	.1				.3

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -2100, BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.2				.3
0.10	1.3	3.3				4.7
0.15	4.8	15.4				20.2
0.20	.7	3.4				4.0
0.25						
0.30						
SUM	6.8	22.4				29.2

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -2100, BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.2				.3
0.10	1.3	3.3				4.7
0.15	4.8	15.4				20.2
0.20	.9	3.5				4.3
0.25						
0.30						
SUM	7.0	22.4				29.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1800, BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10						
0.15						
0.20		.1				.1
0.25						
0.30						
SUM		.1				.1

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1800, BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.2	.7				.9
0.10	1.9	6.5				8.4
0.15	6.6	23.6				30.2
0.20	1.6	6.9				8.6
0.25						
0.30						
SUM	10.3	37.8				48.0

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1800, BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.1					.1
0.15	.2	.5				.7
0.20	.1	.1				.2
0.25						
0.30						
SUM	.3	.6				.9

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1800, BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.2	.7				.9
0.10	1.9	6.5				8.5
0.15	6.8	24.1				30.9
0.20	1.7	7.1				8.8
0.25						
0.30						
SUM	10.6	38.4				49.1

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1500. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.1				.2
0.10	.1					.1
0.15	.1	.2				.3
0.20	.1					.1
0.25						
0.30						
SUM	.3	.3				.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1500. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10		.2				.2
0.15	.1	.4				.5
0.20		.1				.1
0.25						
0.30						
SUM	.1	.7				.8

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1500. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.1	1.5	.1			2.7
0.10	4.0	10.9				14.9
0.15	22.8	64.6				87.5
0.20	5.6	12.0				17.6
0.25						
0.30						
SUM	33.6	89.0	.1			122.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1500. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.1				.1
0.10		.0				.0
0.15	.6	1.3				1.9
0.20	.3	.2				.5
0.25						
0.30						
SUM	.9	1.6				2.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1500. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.3	1.6	.1			3.0
0.10	4.1	11.1				15.2
0.15	23.6	66.6				90.1
0.20	5.9	12.3				18.2
0.25						
0.30						
SUM	34.8	91.6	.1			126.5

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1200. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.5				.6
0.10		.3				.3
0.15	.1	.4				.6
0.20	.1	.0				.1
0.25						
0.30						
SUM	.3	1.3				1.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1200. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.1					.1
0.15	.7	.2				.8
0.20	.3	.5				.8
0.25						
0.30						
SUM	1.0	.6				1.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1200. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.6	5.4				6.9
0.10	7.6	24.6				32.1
0.15	36.6	136.1				172.7
0.20	5.5	27.5				33.1
0.25						
0.30						
SUM	51.3	193.6				244.9

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1200. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.4				.5
0.10	.1	.6				.7
0.15	.7	4.3				5.1
0.20	.4	.5				.9
0.25						
0.30						
SUM	1.4	5.9				7.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -1200. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.8	6.3				8.1
0.10	7.8	25.5				33.2
0.15	38.1	141.1				179.1
0.20	6.3	28.6				34.9
0.25						
0.30						
SUM	54.0	201.4				255.3

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -900. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.8	1.3				2.1
0.10	.2	.5				.7
0.15	.7	1.7				2.4
0.20	.1	.1				.2
0.25						
0.30						
SUM	1.9	3.6				5.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -900. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.2	.6				.8
0.15	2.5	3.7				6.1
0.20	.1	.4				.5
0.25						
0.30						
SUM	2.8	4.6				7.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -900. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	8.9	21.2				30.1
0.10	19.2	51.2				70.4
0.15	64.4	209.7				274.1
0.20	10.8	50.7				61.5
0.25						
0.30						
SUM	103.3	332.8				436.1

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -900. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.4	1.5				3.0
0.10		1.0				1.0
0.15	3.6	17.5				21.1
0.20	.4	5.7				6.1
0.25						
0.30						
SUM	5.5	25.7				31.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -900. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	11.1	24.0				35.1
0.10	19.7	53.3				73.0
0.15	71.2	232.6				303.8
0.20	11.4	56.9				68.3
0.25						
0.30						
SUM	113.4	366.8				480.2

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -600. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.9	6.4				8.4
0.10	.5	3.6				4.0
0.15	2.1	8.2				10.2
0.20	.1	.7				.8
0.25						
0.30						
SUM	4.6	18.9				23.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -600. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.4	.5				.9
0.15	2.4	7.5				9.9
0.20	.6	1.5				2.2
0.25						
0.30						
SUM	3.4	9.6				13.0

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -600. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	24.0	65.0				88.9
0.10	37.2	90.2				127.4
0.15	92.7	333.2				425.9
0.20	9.4	64.9				74.3
0.25						
0.30						
SUM	163.2	553.3				716.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -600. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	4.0	6.4				10.4
0.10	.8	5.7				6.5
0.15	19.8	114.8				134.7
0.20	3.5	35.6				39.0
0.25						
0.30						
SUM	28.2	162.4				190.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -600. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	29.9	77.7				107.7
0.10	38.9	99.9				138.8
0.15	117.0	463.7				580.7
0.20	13.5	102.8				116.3
0.25						
0.30						
SUM	199.4	744.2				943.6

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -300. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	45.2	174.9				220.1
0.10	15.9	102.3				118.3
0.15	50.5	284.3				334.8
0.20	3.0	30.6				33.6
0.25						
0.30						
SUM	114.6	592.1				706.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -300. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	2.7	6.1				8.8
0.15	12.8	47.7				60.5
0.20	1.2	16.5				17.6
0.25						
0.30						
SUM	16.7	70.3				87.0

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -300. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	77.6	170.8				248.4
0.10	45.4	106.3				151.7
0.15	130.7	339.4				470.2
0.20	6.6	51.0				57.7
0.25						
0.30						
SUM	260.4	667.6				927.9

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -300. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	129.9	383.1				513.0
0.10	9.8	86.9				96.6
0.15	588.6	4384.9	.4			4973.9
0.20	44.0	794.3				838.3
0.25						
0.30						
SUM	772.3	5649.2	.4			6421.9

MINUTES FOR CT/S VS MU BY RATE OF CLIMB -300. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	252.7	728.8				981.5
0.10	73.8	301.7				375.5
0.15	782.6	5056.3	.4			5839.3
0.20	54.8	892.4				947.2
0.25						
0.30						
SUM	1164.0	6979.1	.4			8143.5

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 300. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	23.9	99.3				123.2
0.10	36.4	230.6				267.0
0.15	37.0	313.9				350.9
0.20	.6	8.6				9.2
0.25						
0.30						
SUM	97.9	652.4				750.3

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 300. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.2					.2
0.10	.6	1.2				1.8
0.15	1.6	7.1				8.8
0.20	.7	1.3				1.9
0.25						
0.30						
SUM	3.1	9.6				12.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 300. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	2.9	7.5				10.3
0.10	1.4	3.9				5.3
0.15	4.6	10.6				15.2
0.20	.6	1.4				1.9
0.25						
0.30						
SUM	9.5	23.3				32.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 300. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	2.9	6.7				9.6
0.10	1.3	10.5				11.9
0.15	12.8	102.8				115.6
0.20	1.3	13.1				14.4
0.25						
0.30						
SUM	18.3	133.1				151.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 300. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	29.9	113.5				143.4
0.10	39.7	246.1				285.9
0.15	56.0	434.4				490.4
0.20	3.1	24.3				27.4
0.25						
0.30						
SUM	128.8	818.3				947.1

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 600. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	14.4	49.4				63.8
0.10	64.1	361.5				425.6
0.15	30.2	178.0				208.2
0.20	.1	2.1				2.2
0.25						
0.30						
SUM	108.8	590.9				699.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 600. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.4				.4
0.10	.3	.3				.5
0.15	1.4	1.6				3.0
0.20	.1	.6				.7
0.25						
0.30						
SUM	1.7	2.9				4.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 600. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.3	1.6				2.9
0.10	1.0	1.4				2.4
0.15	3.4	4.8				8.2
0.20	.2	.5				.7
0.25						
0.30						
SUM	5.9	8.3				14.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 600. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	1.7	2.0				3.7
0.10		3.5				3.5
0.15	2.2	18.1				20.3
0.20	.1	1.1				1.2
0.25						
0.30						
SUM	4.0	24.7				28.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 600. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	17.4	53.3				70.7
0.10	65.3	366.7				432.0
0.15	37.2	202.5				239.7
0.20	.4	4.3				4.8
0.25						
0.30						
SUM	120.4	626.8				747.2

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 900. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	5.1	18.8				23.9
0.10	40.7	163.4				204.1
0.15	8.6	67.5				76.1
0.20	.1	1.2				1.3
0.25						
0.30						
SUM	54.6	250.8				305.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 900. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.7					.7
0.10	.8	.2				1.0
0.15	.7	.7				1.4
0.20	.1					.1
0.25						
0.30						
SUM	2.3	.9				3.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 900. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1	.1				.2
0.10	.1	.2				.3
0.15	.2	.4				.6
0.20	.1					.1
0.25						
0.30						
SUM	.5	.7				1.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 900. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.2	.5				.7
0.10	.1	.8				.8
0.15	.9	4.8				5.7
0.20		.7				.7
0.25						
0.30						
SUM	1.2	6.8				8.0

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 900. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	6.1	19.4				25.5
0.10	41.7	164.6				206.3
0.15	10.4	73.3				83.7
0.20	.2	1.9				2.2
0.25						
0.30						
SUM	58.5	259.2				317.7

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1200. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.6	4.9				5.5
0.10	11.2	36.3				47.5
0.15	3.3	10.5				13.7
0.20	.1	.6				.7
0.25						
0.30						
SUM	15.2	52.2				67.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1200. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.8	.4				1.1
0.15	.5	.6				1.1
0.20		.1				.1
0.25						
0.30						
SUM	1.3	1.1				2.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1200. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.1					.1
0.10	.1					.1
0.15	.2	.3				.4
0.20						
0.25						
0.30						
SUM	.4	.3				.6

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1200. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10		.4				.4
0.15	.3	1.4				1.7
0.20		.1				.1
0.25						
0.30						
SUM	.3	1.9				2.3

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1200. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.7	5.0				5.7
0.10	12.1	37.0				49.1
0.15	4.3	12.7				17.0
0.20	.1	.8				.9
0.25						
0.30						
SUM	17.1	55.6				72.7

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1500. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.3	.6	.1			.9
0.10	3.1	10.3	.1			13.4
0.15	.9	3.6				4.5
0.20	.1	.4				.5
0.25						
0.30						
SUM	4.4	14.8	.1			19.3

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1500. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.1	.0				.2
0.15	.1	.0				.2
0.20						
0.25						
0.30						
SUM	.3	.1				.4

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1500. BY MISSION SEG. DESCNT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10		.1				.1
0.15		.1				.1
0.20						
0.25						
0.30						
SUM		.2				.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1500. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	.3	.6	.1			.9
0.10	3.3	10.4	.1			13.7
0.15	1.1	3.7				4.8
0.20	.1	.4				.5
0.25						
0.30						
SUM	4.7	15.0	.1			19.9

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1800. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	.7	4.7	.1			5.6
0.15	.4	.5				.9
0.20						
0.25						
0.30						
SUM	1.1	5.3	.1			6.5

TABLE X - Continued

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1800. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10		.2				.2
0.15						
0.20						
0.25						
0.30						
SUM		.2				.2

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 1800. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	.7	4.9	.1			5.8
0.15	.4	.5				.9
0.20						
0.25						
0.30						
SUM	1.1	5.5	.1			6.7

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 2100. BY MISSION SEG. ASCENT

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	.3	.4				.7
0.15	.0	.7				.7
0.20		.0				.0
0.25						
0.30						
SUM	.3	1.2				1.5

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 2100. BY MISSION SEG. MANUVR

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10	.1					.1
0.15		.0				.0
0.20		.0				.0
0.25						
0.30						
SUM	.1	.1				.1

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 2100. BY MISSION SEG. STEADY

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05						
0.10						
0.15		.1				.1
0.20						
0.25						
0.30						
SUM		.1				.1

TABLE X - Concluded

MINUTES FOR CT/S VS MU BY RATE OF CLIMB 2100. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05		.1				.1
0.10	.4	.4				.7
0.15	.0	.8				.8
0.20		.1				.1
0.25						
0.30						
SUM	.4	1.4				1.8

MINUTES FOR CT/S VS MU BY RATE OF CLIMB SUM. BY MISSION SEG. SUM

	LESS	0.06	0.09	0.12	0.15	SUM
LESS						
0.05	351.6	1031.3	.1			1383.0
0.10	311.6	1332.5	.2			1644.4
0.15	1156.4	6739.8	.4			7896.7
0.20	99.2	1138.7				1237.9
0.25		.1	.1			.1
0.30						
SUM	1918.7	10242.5	.8			12162.1

TABLE XI. TIME FOR ENGINE TORQUE VERSUS AIRSPEED BY WEIGHT AND ALTITUDE

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE LESS

	LESS	10	20	30	40	50	60	70	SUM
LESS		.1		.6					.7
40		.4		.3					.7
60		.1							.1
65			.1						.1
70									
75									
80									
85									
90									
95									
100									
105									
110									
115									
120									
SUM		.6	.1	.9					1.5

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 1000

	LESS	10	20	30	40	50	60	70	SUM
LESS	.2	6.7	15.9	36.6	5.6	.6			65.6
40	1.8	11.2	2.2	4.4	5.4				25.0
60	1.0	2.4	1.0	2.7	.3				7.4
65	1.3	2.7	1.4	.7	2.2				8.4
70	.5	2.9	2.8	2.3	.6				9.1
75	.9	3.4	2.0	1.2	.1				7.6
80	.8	2.5	4.2	.9	.1				8.6
85	.2	1.6	2.4	1.1					5.3
90	.1	.9	1.6	1.8					4.4
95		.1	.6						.8
100			.1	.1					.2
105	.1	.1		.1					.4
110									
115									
120									
SUM	6.9	34.6	34.3	51.9	14.3	.6			142.6

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 2000

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.0	4.6	22.1	26.2	1.5				55.4
40	2.3	8.2	2.8	15.7	7.9				36.8
60	.7	5.1	4.3	8.6	3.7				22.4
65	1.0	5.3	7.0	13.0	3.1				29.4
70	1.5	6.0	11.1	17.0	2.3				38.0
75	2.9	12.9	41.6	23.3	1.2				81.7
80	1.6	21.0	83.2	37.6	1.7				145.0
85	2.0	27.2	109.2	45.6	1.5				185.5
90	.8	14.9	120.3	62.1	.7				198.8
95	.3	13.8	58.6	20.8	.7				94.2
100	.7	2.1	11.1	10.6					24.5
105	.4	.3	2.9	2.5					6.0
110		.2	.9						1.1
115									
120									
SUM	15.1	121.5	474.9	283.0	24.3				918.8

TABLE XI - Continued

MINUTES FOR TORQUE VS AIRSPFED BY WEIGHT 6000. BY ALTITUDE 5000

	LESS	10	20	30	40	50	60	70	SUM
LESS									
40				1.2	3.7				4.9
60			.0	.5	.4				.9
65		.1		.0	.4				.5
70			.0	.7	.2				.9
75		.1	1.3	2.7					4.1
80		.8	8.4	6.1					15.3
85		.9	45.5	26.7					73.1
90		3.3	27.4	9.9					40.6
95		2.0	8.9	.2					11.1
100			1.3						1.3
105									
110									
115									
120									
SUM		7.1	93.0	47.9	4.7				152.8

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.2	11.5	38.0	63.4	7.1	.6			121.7
40	4.0	19.8	5.0	21.5	17.0				67.3
60	1.7	7.6	5.3	11.8	4.4				30.7
65	2.4	8.1	8.4	13.7	5.8				38.4
70	2.0	9.0	13.9	20.0	3.1				48.0
75	3.8	16.3	44.8	27.2	1.2				93.4
80	2.4	24.2	95.8	44.6	1.8				168.9
85	2.2	29.6	157.2	73.4	1.5				263.8
90	.9	19.1	149.3	73.8	.7				243.8
95	.3	16.0	68.1	21.0	.7				106.1
100	.7	2.1	12.5	10.7					26.0
105	.4	.4	2.9	2.6					6.4
110		.2	.9						1.1
115									
120									
SUM	22.0	163.9	602.2	383.7	43.3	.6			1215.7

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE LESS

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1	1.6	7.0	19.1	1.7	.1			29.6
40	1.1	1.8		1.6	.3				4.7
60	.2	.3		.2	.1				.7
65	.0			.1	.0				.2
70	.0	.0		.0					.1
75	.0	.2		.1					.3
80				.0	.0				.1
85		.0	.2	.0	.1				.3
90	.0		.3	.2	.0				.6
95		.0	4.1	.8	.3				5.2
100	.0		3.5	.8					4.3
105									
110									
115									
120									
SUM	1.6	4.0	15.0	23.1	2.5	.1			46.2

TABLE XI - Continued

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 1000

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.1	22.0	77.7	228.3	29.7	.2			359.0
40	10.3	52.7	9.9	40.2	19.9	.1			133.1
60	4.0	13.7	3.3	14.4	7.0				42.4
65	3.8	12.7	2.7	20.5	5.1	.1			44.9
70	2.3	12.6	8.2	15.6	4.2				42.9
75	2.6	13.1	12.5	12.6	4.0				44.8
80	1.8	11.1	17.3	7.9	2.6	.0			40.6
85	1.4	8.3	23.9	9.8	1.1	.0			44.5
90	1.2	5.5	12.7	6.6	.9				26.9
95	.5	1.7	3.0	9.9	.4				15.6
100	.1	.2	.7	4.4	.9				6.3
105		.0	.5	2.8	2.4	.1			5.9
110		.5	.1	.1	1.5				2.1
115		.0			.0				.1
120									
SUM	29.2	154.2	172.5	373.2	79.7	.6			809.3

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 2000

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1	12.1	34.2	136.3	12.6				195.4
40	10.9	31.2	19.2	98.5	32.5				192.3
60	7.6	16.0	23.4	69.1	22.0				138.1
65	6.7	18.7	36.2	84.2	20.7				166.4
70	9.0	27.9	58.2	106.3	14.4				215.8
75	10.0	37.7	151.0	127.3	12.1				338.1
80	9.2	60.5	386.6	206.4	7.1				669.7
85	6.0	72.4	635.8	267.1	7.3				988.7
90	6.5	64.5	648.4	402.3	3.7				1125.3
95	2.2	29.1	226.7	258.3	3.3				519.6
100	.4	9.3	54.4	87.9	1.0				153.0
105		2.2	8.2	19.3	.2				29.8
110		2.0	1.1	8.4	.1				11.6
115		.7		.3					1.0
120									
SUM	68.7	384.4	2283.2	1871.6	136.8				4744.7

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 5000

	LESS	10	20	30	40	50	60	70	SUM
LESS					.1				.1
40			.1	1.6	2.1				3.9
60	.2		.5	.2	.7				1.6
65	.7		.3	5.1	.4				6.5
70	.8	.6	1.0	3.3	.8				6.5
75	1.0	1.5	6.7	3.1	.6				12.9
80	.6	2.4	21.2	5.1	.6				29.9
85	.6	1.4	22.0	14.6					38.7
90	.7	.8	16.4	12.2					30.1
95	1.4	.1	3.1	9.4					13.9
100	.1		.1	4.4					4.6
105		.0							.0
110									
115									
120									
SUM	6.1	6.9	71.4	59.1	5.2				148.7

TABLE XI - Continued

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 10000

	LESS	10	20	30	40	50	60	70	SUM
LESS									
40	.1	.2	.2	.3	1.5				2.3
60	.1	.0							.1
65	.7	.2							.9
70	.3	.2							.5
75				.3					.3
80	.3			4.1					4.4
85	.6			1.7					2.3
90				1.2					1.2
95				1.2					1.2
100									
105									
110									
115									
120									
SUM	2.1	.6	.2	8.8	1.5				13.1

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.3	35.7	118.9	383.8	44.1	.3			584.1
40	22.5	85.9	29.5	142.2	56.2	.1			336.3
60	12.1	30.0	27.2	84.0	29.7				182.9
65	12.0	31.6	39.1	109.8	26.3	.1			219.0
70	12.5	41.3	67.3	125.3	19.3				265.8
75	13.7	52.5	170.2	143.4	16.7				396.4
80	11.9	73.9	425.0	223.5	10.3	.0			744.7
85	8.6	82.2	681.9	293.2	8.5	.0			1074.5
90	8.4	70.7	677.8	422.6	4.6				1184.1
95	4.1	31.0	236.8	279.6	3.9				555.4
100	.7	9.6	58.7	97.5	1.9				168.3
105		2.3	8.7	22.1	2.6	.1			35.8
110		2.5	1.2	8.4	1.5				13.6
115		.7		.3	.0				1.1
120									
SUM	107.7	550.0	2542.3	2335.7	225.7	.7			5762.1

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE LESS

	LESS	10	20	30	40	50	60	70	SUM
LESS		1.6	5.2	27.8	3.0				37.5
40	.3	1.5	.3	2.4	1.0				5.3
60	.2	.1	.3	.7	.5				1.8
65		.1		.5					.6
70		.1		.1					.2
75				.2					.2
80				.1					.1
85				.0					.0
90									
95									
100									
105									
110									
115									
120									
SUM	.4	3.3	5.7	32.0	4.5				45.9

TABLE XI - Continued

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 1000

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.1	15.7	39.1	159.6	44.0	.2			259.7
40	7.2	32.6	11.7	35.0	24.7				111.2
60	3.9	11.0	4.7	16.0	11.7				47.3
65	3.4	9.9	5.1	19.9	6.8				45.1
70	2.5	8.2	5.2	18.3	6.1				40.3
75	3.0	11.3	5.4	12.0	3.8				35.5
80	2.0	8.3	13.1	10.9	3.8				38.1
85	1.8	8.5	18.2	10.2	1.5				40.2
90	1.2	5.2	9.8	15.6	.4				32.3
95	.4	2.0	4.7	5.5	.6				13.2
100		.5	.3	3.8	.5				5.2
105			.3	1.0	1.5				2.9
110			.1	.3	.9				1.3
115					.5				.5
120									
SUM	26.6	113.3	117.9	308.1	106.8	.2			672.9

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 2000

	LESS	10	20	30	40	50	60	70	SUM
LESS	.3	10.9	31.4	127.8	22.6				193.0
40	8.3	29.0	16.1	119.8	31.9				205.1
60	4.3	10.4	15.9	92.6	20.4				143.6
65	4.0	14.5	26.4	94.5	23.3				162.7
70	4.9	17.7	53.3	114.5	16.3				206.8
75	6.7	45.1	102.6	145.3	13.7				313.3
80	9.2	43.5	292.5	253.4	10.3				609.0
85	8.7	57.9	523.7	383.6	3.6				977.4
90	5.8	49.2	379.0	461.8	2.0				897.9
95	4.8	31.1	121.7	296.9	1.9				456.3
100	.2	8.1	17.8	65.3	.4				91.8
105	.2	.8	2.2	6.9					10.1
110	.2	.3	.5	.4					1.4
115	.1								.1
120									
SUM	57.7	318.4	1583.0	2162.9	146.4				4268.4

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 5000

	LESS	10	20	30	40	50	60	70	SUM
LESS					.2				.2
40	.2	.1		1.4	2.7				4.5
60	.2			2.4	.8				3.5
65	.1		1.2	8.9	.1				10.4
70	.1	.1	.9	2.6	.4				4.0
75	.1	.1	4.0	6.8	.2				11.1
80	.2	.3	10.6	12.7	.4				24.3
85	1.6	.3	33.4	29.6	.1				65.0
90	2.6	.6	19.8	20.2					43.2
95	1.7	.3	3.8	11.5					17.3
100	.2	.4	.2	.7					1.5
105	.1								.1
110	.2								.2
115									
120									
SUM	7.4	2.3	73.8	97.0	4.8				185.3

TABLE XI - Concluded

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000, BY ALTITUDE 10000

	LESS	10	20	30	40	50	60	70	SUM
LESS									
40									
60									
65									
70									
75									
80				.8					.8
85				8.3					8.3
90			.2	2.4					2.6
95			.1						.1
100									
105									
110									
115									
120									
SUM			.3	11.5					11.8

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	1.4	28.1	75.7	315.3	69.8	.2			490.4
40	15.9	63.2	28.0	158.6	60.3				326.1
60	8.6	21.6	20.8	111.8	33.5				196.3
65	7.5	24.4	32.7	123.9	30.2				218.8
70	7.5	26.1	59.4	135.5	22.8				251.4
75	9.8	56.4	112.0	164.3	17.6				360.2
80	11.5	52.1	316.2	278.0	14.5				672.3
85	12.1	66.7	575.3	431.8	5.1				1091.0
90	9.6	55.0	408.8	500.0	2.4				975.8
95	6.9	33.5	130.3	313.9	2.5				487.0
100	.4	9.1	18.4	69.8	.9				98.6
105	.2	.8	2.5	7.9	1.5				13.0
110	.4	.3	.6	.7	.9				2.8
115	.1				.5				.6
120									
SUM	92.1	437.3	1780.8	2611.4	262.5	.2			5184.3

MINUTES FOR TORQUE VS AIRSPEED BY WEIGHT SUM, BY ALTITUDE SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	4.0	75.4	232.6	762.5	120.9	1.0			1196.3
40	42.4	168.9	62.4	322.4	133.5	.1			729.7
60	22.4	59.1	53.3	207.5	67.6				409.9
65	21.9	64.1	80.3	247.4	62.3	.1			476.1
70	22.0	76.4	140.7	280.8	45.2				565.2
75	27.3	125.3	326.9	334.9	35.6				850.0
80	25.8	150.2	837.1	546.1	26.6	.0			1585.9
85	22.9	178.5	1414.4	798.4	15.1	.0			2429.4
90	18.9	144.8	1235.9	996.4	7.7				2403.7
95	11.2	80.5	435.2	614.5	7.1				1148.5
100	1.7	20.7	89.6	177.9	2.9				292.9
105	.7	3.5	14.1	32.6	4.1	.1			55.2
110	.4	2.9	2.7	9.1	2.4				17.5
115	.1	.7		.3	.5				1.7
120									
SUM	221.8	1151.1	4925.3	5330.8	531.6	1.4			12162.1

TABLE XII. TIME FOR ENGINE TORQUE VERSUS ROTOR SPEED BY MISSION SEGMENT, RATE OF CLIMB, AND OUTSIDE AIR TEMPERATURE

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.1					.2
324			.1		.1				.2
330									
339									
SUM			.2	.1	.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1500. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1500. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324				.1					.1
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.2					.3
324			.1	.1	.1				.2
330									
339									
SUM			.2	.3	.1				.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.0	.1						.2
324			.1		.1				.2
330									
339									
SUM		.0	.2		.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.2				.2
314			.1	.1					.2
324			.1						.1
330									
339									
SUM			.2	.1	.2				.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -1200, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1	.2						.2
324			.1	.1	.3				.4
330									
339									
SUM		.1	.2	.1	.3				.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -1200, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.2				.2
314		.1	.4	.1					.6
324			.3	.1	.3				.8
330									
339									
SUM		.1	.7	.2	.5				1.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -900, BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324			.1						.1
330									
339									
SUM			.1						.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -900, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324			.1						.1
330									
339									
SUM			.1	.1					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -900, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.3	.5	.5	.0				1.4
324			.2	.2					.4
330		.2							.2
339									
SUM		.5	.6	.7	.0				1.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB -900, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.0					.0
314		.2	.5	.7	.3				1.7
324				.2	.2				.3
330			.3	.1	.1				.5
339									
SUM		.2	.9	1.0	.5				2.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.3					.5
324				.3	.1				.3
330									
339									
SUM			.2	.6	.1				.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.0					.0
314		.5	1.2	1.7	.3				3.6
324			.3	.6	.2				1.2
330		.2	.3	.1	.1				.6
33									
SUM		.7	1.8	2.4	.6				5.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324				.1					.1
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1	.1				.2
324				.2					.2
330									
339									
SUM				.3	.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314		1.5	2.2	3.3	.1				7.2
324			1.2	.5					1.8
330									
339									
SUM		1.5	3.5	3.9	.1				9.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.1				.1
314		.1	2.1	3.2	1.1				6.6
324			.4	1.0	.3				1.6
330			.2	.3					.4
339									
SUM		.1	2.6	4.5	1.5				8.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314	.2	.1	1.7	.8					2.9
324		.2	.2	1.0	.3				1.8
330		.1	.4	.1					.5
339									
SUM	.2	.4	2.3	2.0	.3				5.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.2	.1				.3
314	.2	1.7	6.1	7.5	1.4				16.9
324		.2	1.8	2.8	.6				5.4
330		.1	.5	.3					.9
339									
SUM	.2	2.0	8.4	10.8	2.0				23.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -300. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2					.2
324									
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -300. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				3.2					3.2
324				.1					.1
330									
339									
SUM				3.2					3.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.4					.4
314			5.2	9.6	.7				15.5
324			1.6	3.5	.1				5.2
330				.1					.1
339									
SUM			6.8	13.6	.7				21.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB -300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.6	3.4	4.1				8.1
314		1.4	56.1	151.7	12.7	.1			221.9
324		.1	10.0	37.2	2.9				50.2
330		.2	2.2	7.6	.5				10.5
339									
SUM		1.6	68.8	199.9	20.2	.1			290.7

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB -300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.7	2.7	1.5				4.8
314		.5	28.8	116.4	16.4	.2			162.4
324			10.0	29.8	5.6				45.4
330		.1	3.0	6.0	.1				9.2
339									
SUM		.6	42.5	154.8	23.6	.2			221.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB -300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.2	3.0	.1				3.3
314		.5	37.4	82.3	6.1				126.3
324		.5	11.5	20.3	2.9				35.3
330		.0	1.9	2.9					4.8
339									
SUM		1.0	51.0	108.5	9.2				169.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB -300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			1.4	9.5	5.7				16.6
314		2.3	127.6	363.4	35.9	.3			529.5
324		.5	33.1	90.9	11.5				136.1
330		.3	7.0	16.6	.6				24.6
339									
SUM		3.2	169.2	480.4	53.7	.3			706.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 300. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				4.3					4.3
324									
330									
339									
SUM				4.3					4.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.4					.4
314			.8	18.1	1.7				20.6
324				1.9	1.1				3.0
330				1.3					1.3
339									
SUM			.8	21.7	2.8				25.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.1	1.0	1.1				2.2
314		.0	16.9	226.9	25.2	.3			269.3
324			2.2	36.4	5.7				44.3
330				3.4	.6				3.9
339									
SUM		.0	19.2	267.6	32.6	.3			319.7

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				5.3	4.6				9.9
314			7.6	141.3	24.3				173.1
324			1.4	46.6	8.9				56.8
330			.1	8.6	.9				9.7
339									
SUM			9.1	201.8	38.7				249.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				4.3	.3				4.6
314			10.5	99.5	7.7				117.7
324			5.1	13.8	3.3				22.2
330			2.6	4.3					6.9
339									
SUM			18.2	121.9	11.3				151.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.1	10.9	6.0				17.1
314		.0	35.7	490.1	58.9	.3			585.0
324			8.7	98.7	18.9				126.3
330			2.8	17.6	1.5				21.9
339									
SUM		.0	47.3	617.3	85.4	.3			750.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 600. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				3.3	.3				3.6
324				.5					.5
330									
339									
SUM				3.8	.3				4.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.5	20.7	1.4				22.5
324			.3	2.9	2.9				6.1
330				.2					.2
339									
SUM			.8	23.7	4.3				29.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				5.1	1.0				6.0
314			5.3	173.5	46.1	.1			224.9
324			.3	24.4	14.5				39.2
330				3.8	1.7				5.4
339									
SUM			5.7	206.7	63.2	.1			275.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.1	3.9	4.0				8.0
314			2.3	149.7	42.1	.1			194.2
324			.6	40.6	13.4				54.6
330			.3	5.8	2.2				8.2
339									
SUM			3.3	199.9	61.6	.1			264.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				5.2					5.2
314			4.9	75.0	10.7				90.6
324			.6	18.7	8.8				28.1
330			.2	2.0	.2				2.4
339									
SUM			5.8	100.8	19.7				126.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.1	14.1	4.9				19.2
314			13.0	422.1	100.5	.2			535.8
324			1.9	87.0	39.6				128.4
330			.5	11.7	4.0				16.3
339									
SUM			15.5	534.9	149.1	.2			699.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 900. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2					.2
324									
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 900. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				7.1	3.3				10.5
324				1.8	.1				1.8
330									
339									
SUM				8.9	3.4				12.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT, BY RATE OF CLIMB 900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.6	1.4				2.0
314			.5	64.9	44.5	.1			109.9
324				14.3	14.7				29.0
330				.8	.5				1.2
339									
SUM			.5	80.5	61.1	.1			142.2

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				1.4	1.2				2.6
314			.4	54.5	34.1				89.0
324			.1	10.0	9.8				19.9
330				1.9	2.6				4.5
339									
SUM			.5	67.8	47.7				116.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				1.2					1.2
314			.5	20.3	3.4				24.3
324			.2	3.6	3.5				7.4
330			.1	1.6					1.7
339									
SUM			.9	26.8	7.0				34.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				3.3	2.6				5.8
314			1.5	147.0	85.3	.1			233.9
324			.3	29.7	28.2				58.2
330			.1	4.3	3.1				7.5
339									
SUM			1.9	184.2	119.1	.1			305.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1200. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.8	.3				1.1
324				.1	.1				.2
330									
339									
SUM				.9	.4				1.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.2				.2
314			.2	8.9	15.4				24.4
324				1.6	3.8				5.4
330				.2					.2
339									
SUM			.2	10.7	19.4				30.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.2	.3				.5
314			.1	7.2	10.0				17.4
324				4.4	2.9				7.2
330		.1		.6	.3				1.0
339									
SUM		.1	.1	12.3	13.5				26.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1200. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.4					.4
314			.1	4.5	1.4				6.0
324			.2	1.6	1.0				2.8
330			.1	.5					.5
339									
SUM			.3	7.0	2.5				9.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.6	.6				1.1
314			.4	21.4	27.1				48.9
324			.2	7.6	7.9				15.7
330		.1	.1	1.3	.3				1.7
339									
SUM		.1	.6	30.9	35.9				67.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1500. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324			.1						.1
330									
339									
SUM			.1	.1					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1500. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1	1.5				1.6
324									
330									
339									
SUM				.1	1.5				1.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1500. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1	.8				1.0
324				.1					.1
330									
339									
SUM				.3	.8				1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.1				.1
314				1.4	3.6				5.0
324				.3	.4				.7
330				.3					.3
339									
SUM				2.1	4.0				6.1

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1500, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.2				.2
314				1.7	3.9				5.6
324				.7	.5				1.2
330					.1				.1
339									
SUM				2.4	4.7				7.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1500, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2	.4				.6
324				1.1	1.3				2.4
330				.1	.1				.2
339									
SUM				1.3	1.8				3.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1500, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.3				.3
314				3.7	10.2				13.9
324			.1	2.3	2.2				4.5
330				.4	.2				.6
339									
SUM			.1	6.3	12.9				19.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1800, BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1800, BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					1.3				1.3
324									
330									
339									
SUM					1.3				1.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG, ASCENT, BY RATE OF CLIMB 1800, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					.6				.6
324									
330									
339									
SUM					.6				.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1800. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1	1.3				1.4
324					.5				.5
330									
339									
SUM				.1	1.8				1.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1800. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.3	.6				1.0
324				.2	.3				.6
330				.1					.1
339									
SUM			.1	.6	1.0				1.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1800. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.5					.5
324				.1	.3				.4
330				.0					.0
339									
SUM				.7	.3				.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 1800. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	1.1	3.8				5.0
324				.4	1.1				1.5
330				.1					.1
339									
SUM			.1	1.6	4.9				6.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 2100. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					.2				.2
324									
330									
339									
SUM					.2				.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 2100. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.1				.1
314				.4	.4				.8
324					.1				.1
330									
339									
SUM				.4	.6				1.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 2100. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324					.3				.3
330					.0				.0
339									
SUM					.3				.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. ASCENT. BY RATE OF CLIMB 2100. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294					.1				.1
314				.4	.6				1.0
324					.4				.4
330					.0				.0
339									
SUM				.4	1.2				1.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB LESS. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS	.3								.3
294	.2								.2
314	.1								.1
324	.0								.0
330									
339									
SUM	.6								.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB LESS. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.3								.3
294	.2								.2
314	.1								.1
324	.0								.0
330									
339									
SUM	.6								.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -2100. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1							.1
324	.1		.1						.2
330									
339									
SUM	.1	.1	.1						.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -2100. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1							.1
324	.1		.1						.2
330									
339									
SUM	.1	.1	.1						.3

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1800. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					.1				.1
324									
330									
339									
SUM					.1				.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1800. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					.1				.1
324									
330									
339									
SUM					.1				.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1500. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324		.2							.2
330									
339									
SUM		.2							.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1500. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1		.1				.1
324			.1						.1
330		.1	.1						.2
339									
SUM		.1	.2		.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1500. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324									
330		.1	.1						.2
339									
SUM		.1	.1						.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1		.1				.1
324		.2	.1						.3
330		.2	.2						.3
339									
SUM		.4	.3		.1				.8

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -1200, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324		.2							.2
330									
339									
SUM		.2							.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -1200, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.4	.2	.1					.6
324			.3						.3
330		.1							.1
339									
SUM		.5	.5	.1					1.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -1200, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1								.1
294									
314			.1	.1	.1				.3
324			.0						.0
330	.0								.0
339									
SUM	.1		.1	.1	.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -1200, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324		.1							.1
330									
339									
SUM		.1							.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -1200, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1								.1
294									
314		.4	.3	.1	.1				.9
324		.3	.3						.6
330	.0	.1							.1
339									
SUM	.1	.7	.6	.1	.1				1.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG, MANUVR, BY RATE OF CLIMB -900, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2					.2
324		.5							.5
330									
339									
SUM		.5		.2					.8

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.5	.4	.2					1.1
324		.8	1.2						2.0
330		.2	.4						.6
339									
SUM		1.5	2.0	.2					3.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2	.7	.1	.1				1.2
324		.4	.2	.1					.7
330		.1	.6						.7
339									
SUM		.8	1.4	.2	.1				2.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1							.1
324									
330		.3	.1						.3
339									
SUM		.3	.1						.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.8	1.1	.6	.1				2.6
324		1.8	1.3	.1					3.2
330		.5	1.1						1.6
339									
SUM		3.1	3.5	.7	.1				7.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	1.0					1.1
324									
330									
339									
SUM			.1	1.0					1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1	1.2	.4					1.6
324		.4	2.9	1.5					4.8
330		.1	.4	.1					.6
339									
SUM		.5	4.5	1.9					6.9

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -600, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.0								.0
314		.1	.4	1.1	.5				2.1
324		.1							.1
330	.0		.3	.2					.5
339									
SUM	.1	.1	.6	1.3	.5				2.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -600, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2	.7	.1					.9
324		.7							.7
330		.1	.6						.7
339									
SUM		1.0	1.3	.1					2.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -600, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.0								.0
314		.3	2.3	2.5	.5				5.7
324		1.2	2.9	1.5					5.6
330	.0	.2	1.2	.3					1.7
339									
SUM	.1	1.7	6.5	4.3	.5				13.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -300, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			4.1	8.4					12.5
324		.1	1.6	.4					2.1
330									
339									
SUM		.1	5.7	8.8					14.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -300, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1	6.1	10.9					17.1
324		.4	14.6	6.9	.5				22.4
330		.3	2.6	.6					3.6
339									
SUM		.7	23.4	18.5	.5				43.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR, BY RATE OF CLIMB -300, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.3	6.5	8.8	5.0				20.6
324		.1	1.2						1.3
330	.1	.6	.7	.2					1.5
339									
SUM	.1	1.0	8.4	9.0	5.0				23.4

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			2.6	1.2					3.9
324		.1	.1	.2					.3
330	.4	.5	.7						1.6
339									
SUM	.4	.5	3.4	1.4					5.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB -300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.4	19.4	29.4	5.0				54.2
324		.7	17.5	7.4	.5				26.1
330	.5	1.4	4.0	.8					6.7
339									
SUM	.5	2.4	40.9	37.7	5.4				87.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.5					.5
324			.4						.4
330									
339									
SUM			.4	.5					.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.3	3.0					3.3
324			1.1	2.7	.2				3.9
330				.5					.5
339									
SUM			1.4	6.1	.2				7.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	1.5	.6				2.2
324			.3	.2					.5
330				.4					.4
339									
SUM			.5	2.1	.6				3.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.2					.3
324			.2						.2
330			.4						.4
339									
SUM			.8	.2					1.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.6	5.1	.6				6.3
324			2.0	2.8	.2				5.0
330			.4	.9					1.3
339									
SUM			3.1	8.8	.8				12.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	1.0					1.2
324				.5					.5
330				.2					.2
339									
SUM			.2	1.6					1.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS		.0							.0
294									
314			.3	.8	.3				1.4
324			.1						.1
330			.1	.2					.3
339									
SUM		.0	.4	1.0	.3				1.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.6					.6
324			.1						.1
330		.1	.1	.0					.3
339									
SUM		.1	.2	.7					.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS		.0							.0
294									
314			.4	2.5	.3				3.3
324			.2	.5					.6
330		.1	.2	.4					.7
339									
SUM		.1	.8	3.4	.3				4.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 900. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2						.2
324									
330									
339									
SUM			.2						.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.0	.2	.8				1.0
324				.0	.2				.3
330				.3					.3
339									
SUM			.0	.5	1.0				1.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.0	.9	.1				1.0
324				.2					.2
330			.1	.1					.2
339									
SUM			.1	1.1	.1				1.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1						.1
324									
330									
339									
SUM			.1						.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.3	1.1	.9				2.3
324				.2	.2				.4
330			.1	.4					.4
339									
SUM			.4	1.6	1.1				3.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.7	.1				.8
324									
330									
339									
SUM				.7	.1				.8

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.0							.0
314				.9	.5				1.4
324				.0					.0
330				.1					.1
339									
SUM		.0		1.0	.5				1.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.0							.0
314				1.6	.6				2.2
324				.0					.0
330				.1					.1
339									
SUM		.0		1.7	.6				2.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324					.1				.1
330									
339									
SUM					.1				.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1500. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.2					.3
324									
330									
339									
SUM			.1	.2					.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.2					.3
324					.1				.1
330									
339									
SUM			.1	.2	.1				.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 2100. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.0					.0
324			.0						.0
330									
339									
SUM			.0	.0					.1

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 2100. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. MANUVR. BY RATE OF CLIMB 2100. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324			.0						.0
330									
339									
SUM			.0	.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1								.1
324									
330									
339									
SUM	.1								.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	1.9	.1							2.0
324	.3								.3
330	.1								.1
339	.1								.1
SUM	2.4	.1							2.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	.1							.4
314	1.9								1.9
324	.3	.2							.5
330	.1								.1
339									
SUM	2.6	.2							2.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3		.1						.4
314	2.5	1.5	.0						4.0
324	2.4	2.1							4.4
330	1.5	.3							1.9
339									
SUM	6.6	3.9	.1						10.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1	.2							.3
314	.2	.3							.5
324		.2							.2
330	.7	.4							1.0
339	.0								.0
SUM	1.0	1.1							2.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	1.5	.2							1.7
324	.5	.1							.7
330	.1	.1							.2
339									
SUM	2.2	.4							2.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB LESS. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.7	.2	.1						1.0
314	8.1	2.1	.0						10.2
324	3.5	2.6							6.1
330	2.4	.8							3.2
339	.1								.1
SUM	14.8	5.7	.1						20.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -2100. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.5								.5
324									
330									
339									
SUM	.5								.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -2100. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	1.4								1.4
324									
330									
339									
SUM	1.4								1.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -2100. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	1.1								1.1
324	.2								.2
330									
339									
SUM	1.3								1.3

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -2100, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	2.7								2.7
324	.9	.7							1.6
330									
339									
SUM	3.5	.7							4.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -2100, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1	.1							.1
314	5.2	1.2	.1						6.5
324	2.7	2.4	.2						5.4
330	1.2	.7							1.9
339									
SUM	9.2	4.4	.4						14.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -2100, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	.3							.5
314	.5	1.5	.1	.1					2.1
324	.2	.6							.8
330	1.3	.5							1.8
339									
SUM	2.2	2.8	.1	.1					5.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -2100, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	1.5	.6							2.2
324	.1	.2							.3
330		.0	.0						.1
339									
SUM	1.6	.9	.0						2.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -2100, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	.3							.7
314	12.8	3.3	.2	.1					16.4
324	4.1	3.9	.2						8.2
330	2.6	1.3	.0						3.9
339									
SUM	19.8	8.8	.5	.1					29.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT, BY RATE OF CLIMB -1800, BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324	.2								.2
330									
339									
SUM	.2								.2

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1							.1
314	.2	.2							.5
324	.4		.1						.5
330			.1						.1
339									
SUM	.7	.4	.1						1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	2.7	.4	.1						3.2
324	.6	1.1							1.8
330		.3							.3
339									
SUM	3.4	1.8	.1						5.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1								.1
294									
314	8.7	7.4	.1						16.2
324	3.0	5.0	.0						8.0
330	2.1	1.4							3.4
339									
SUM	13.9	13.7	.1						27.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	.3							.5
314	3.4	3.7	.4		.1				7.5
324	.3	1.6	.1	.1					2.1
330	.3	.8		.1					1.1
339									
SUM	4.3	6.3	.4	.2	.1				11.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1								.1
314	1.0	.2							1.1
324	.4	.2	.3						.9
330	.1	.1	.2						.4
339	.0								.0
SUM	1.6	.5	.4						2.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -1800, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.1								.1
294	.4	.4							.7
314	16.0	11.8	.5		.1				28.4
324	4.9	8.0	.4	.1					13.4
330	2.5	2.5	.2	.1					5.3
339	.0								.0
SUM	23.9	22.7	1.2	.2	.1				48.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.7								.7
324									
330									
339									
SUM	.7								.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.2								.2
324									
330									
339									
SUM	.2								.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.2								.2
324									
330									
339									
SUM	.2								.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.2							.2
314	1.0	4.5							5.5
324	.5	3.5	.1						4.1
330	.3	1.0	.1						1.4
339									
SUM	1.8	9.3	.2						11.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	.6	.1	.1					1.0
314	18.8	27.4	1.6	.2					48.0
324	5.4	13.8	.8						20.0
330	1.7	3.2	.1						4.9
339									
SUM	26.1	45.0	2.6	.3					74.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS					.1				.1
294	.4	.4	.1						.9
314	6.5	8.0	1.3	.1					15.9
324	2.7	4.8	.4	.1					7.9
330	2.4	1.9		.1					4.4
339									
SUM	12.0	15.1	1.8	.2	.1				29.2

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0								.0
294	.1	.1							.3
314	1.6	2.5	.4	.1					4.7
324	.2	.8	.4	.1					1.5
330		.6	.1						.7
339									
SUM	2.0	4.1	.9	.2					7.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0				.1				.1
294	.8	1.4	.2	.1					2.4
314	29.0	42.4	3.4	.4					75.2
324	8.8	22.9	1.6	.1					33.5
330	4.4	6.8	.2	.1					11.5
339									
SUM	43.0	73.5	5.4	.6	.1				122.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1								.1
324									
330									
339									
SUM	.1								.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.8							.8
314	.5								.5
324									
330									
339									
SUM	.5	.8							1.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		1.1							1.1
314	1.6	3.3	.3						5.3
324	.8	5.4	.8						7.0
330	.3	2.0							2.4
339									
SUM	2.8	11.8	1.1						15.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		1.1		.1					1.2
314	14.1	57.6	10.3	.7					82.8
324	5.4	32.5	3.7	.1					41.6
330	1.5	10.2	1.2						12.9
339									
SUM	21.0	101.3	15.3	.9					138.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1	.7	.1	.2					1.0
314	7.4	22.9	4.9	.3					35.6
324	4.3	20.8	2.3						27.5
330	.8	3.4	.3						4.5
339									
SUM	12.8	47.7	7.6	.5					68.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.2								.2
314	1.5	5.2	1.0	.1					7.8
324	1.6	3.0	1.7	.7	.1				7.1
330	.2	4.2	1.1	.1					5.5
339									
SUM	3.5	12.4	3.8	.9	.1				20.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.3	3.6	.1	.2					4.3
314	25.3	89.0	16.6	1.1					132.0
324	12.4	61.6	8.5	.8	.1				83.3
330	2.8	19.8	2.7	.1					25.3
339									
SUM	40.7	174.0	27.8	2.2	.1				244.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1	.1							.3
324		.0							.0
330									
339									
SUM	.1	.1							.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1							.1
314	.5	1.2	.6	.1					2.4
324	.1		.1						.2
330									
339									
SUM	.6	1.3	.7	.1					2.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1	.3	.1						.5
314	.2	8.9	5.1						14.2
324	.1	5.3	3.2						8.7
330			.5						.5
339									
SUM	.4	14.5	9.0						23.9

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.1	.9	.4	.4					1.8
314	11.1	94.5	48.0	3.6	.1				157.3
324	4.6	36.3	16.0	.6	.1				57.6
330	.8	15.1	1.8						17.7
339									
SUM	16.6	146.7	66.3	4.7	.2				234.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.0	.7	.2	.3					1.2
314	5.6	48.8	20.8	2.8	.2				78.1
324	4.2	23.4	12.1	.7					40.4
330	1.5	7.8	1.8	.2					11.4
339									
SUM	11.4	80.7	34.8	4.0	.2				131.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.2			.1					.3
314	1.7	15.0	5.6	.8	.1				23.2
324	.9	8.9	3.4	.6					13.8
330	1.1	4.0	1.1						6.2
339	.2								.2
SUM	4.0	28.0	10.1	1.6	.1				43.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.4	1.9	.7	.7					3.8
314	19.2	168.4	80.2	7.4	.4				275.6
324	10.0	74.0	34.8	1.9	.1				120.8
330	3.4	27.0	5.2	.2					35.8
339	.2								.2
SUM	33.1	271.3	120.9	10.3	.4				436.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -600. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1							.1
324									
330									
339									
SUM		.1							.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -600. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			1.1	1.0					2.1
324									
330									
339									
SUM			1.1	1.0					2.1

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.5	1.9						2.4
324		.1							.1
330									
339									
SUM		.7	1.9						2.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.4							.4
314	.3	3.5	23.6	.8					28.2
324		1.4	8.4	.6					10.5
330			.1						.1
339									
SUM	.3	5.3	32.0	1.5					39.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294	.2	.8	1.5	.2					2.6
314	5.5	89.2	137.6	16.0	.7				248.9
324	2.0	30.3	35.9	.9	.1				69.2
330	.9	4.4	10.5	.1					16.0
339									
SUM	8.5	124.7	185.5	17.3	.8				336.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.0	1.3	.7	.2				2.2
314	6.7	70.4	65.7	7.6	.6				150.9
324	3.3	33.1	26.0	1.6	.1				64.2
330	1.2	9.3	4.5	.2					15.2
339									
SUM	11.2	112.9	97.5	10.0	.9				232.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0								.0
294	.2	.7	.2	.3					1.5
314	2.6	35.9	22.2	2.7					63.4
324	.7	14.4	7.0	1.3					23.4
330	.6	9.4	4.7	.3					15.0
339									
SUM	4.1	60.4	34.1	4.7					103.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG, DESCNT, BY RATE OF CLIMB -600, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0								.0
294	.4	1.9	3.0	1.3	.2				6.8
314	15.1	199.6	252.0	28.1	1.3				496.1
324	5.9	79.4	77.3	4.5	.2				167.3
330	2.7	23.1	19.8	.6					46.3
339									
SUM	24.1	304.1	352.2	34.5	1.7				716.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 30

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2							.2
324									
330									
339									
SUM		.2							.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1	.4	.5	.4					1.3
324			.1						.1
330									
339									
SUM	.1	.4	.7	.4					1.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1	.2	.2					.5
314	.1	1.3	13.3	3.6					18.3
324	.1	.7	2.6	1.5					4.9
330				.1					.1
339									
SUM	.1	2.1	16.1	5.4					23.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.9	2.4	2.1					5.3
314	2.3	48.0	159.5	61.1	2.1				272.9
324	1.1	15.0	38.2	18.7	.6				73.7
330	.7	1.2	6.7	2.6					11.2
339									
SUM	4.1	65.0	206.8	84.4	2.8				363.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS		.1							.1
294		1.2	2.3	3.2	.5				7.2
314	1.2	50.9	103.2	56.0	6.0				217.3
324	9.6	58.6	55.9	7.7	.9				132.8
330	1.7	12.1	5.0	.9					19.7
339									
SUM	12.4	172.8	166.5	67.9	7.3				377.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0								.0
294	.2	2.2	.6	.2					3.2
314	.4	23.2	57.5	19.8	1.5				102.4
324	.2	12.7	17.8	8.0					38.8
330	1.3	7.4	8.6	.6					17.9
339	.1								.1
SUM	2.2	45.5	84.5	28.7	1.5				162.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB -300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.0	.1							.1
294	.2	4.3	5.5	5.7	.5				16.2
314	4.0	123.9	334.1	141.0	9.6				612.5
324	11.0	87.0	114.7	36.0	1.5				250.2
330	3.6	20.7	20.3	4.2					48.9
339	.1								.1
SUM	18.9	236.0	474.6	186.9	11.6				927.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1	.1	.7					.9
324		.0		.1					.2
330									
339									
SUM		.1	.1	.8					1.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.5	.0	.1				.6
314		.5	5.5	3.6	.4				10.0
324		.3	1.5	.6	.1				2.4
330		.1	.2	.2					.5
339									
SUM		.8	7.6	4.5	.5				13.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.2	.3				.5
314		1.2	2.5	4.3					8.0
324		.4	1.5	.9	.1				2.8
330	.1	.5	.4						1.0
339									
SUM	.1	2.1	4.4	5.4	.4				12.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1							.1
314		.3	1.7	1.0					3.0
324		.4	.7	.6	.1				1.7
330		.6	.3	.1					1.1
339									
SUM		1.4	2.7	1.6	.1				5.8

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1	.5	.3	.3				1.2
314		2.1	9.8	9.6	.4				21.9
324		1.0	3.6	2.2	.3				7.1
330	.1	1.2	1.0	.3					2.5
339									
SUM	.1	4.4	14.9	12.4	1.0				32.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1							.1
324			.1						.1
330									
339									
SUM		.1	.1						.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2	.1	.2					.4
324				.1					.1
330									
339									
SUM		.2	.1	.2					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.1	.3	.7					1.1
324									
330									
339									
SUM		.1	.3	.7					1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294		.1	.0	.3					.4
314		.3	1.3	2.0	.1				3.8
324		.1	.9	.2	.1				1.3
330			.1						.1
339									
SUM		.5	2.4	2.5	.1				5.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS					.1				.1
294		.1		.1					.2
314		.2	1.4	.8	.2				2.7
324		.4	.5	.7					1.6
330	.0	.3	.5	.1	.1				1.0
339				.1					.1
SUM	.0	1.1	2.4	1.7	.3				5.6

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314		.1	.8	.2					1.0
324			.2						.2
330		.1	.1						.2
339									
SUM		.2	1.0	.2					1.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS					.1				.1
294		.1	.0	.5					.6
314		.9	3.9	3.9	.3				9.1
324		.5	1.7	.9	.1				3.2
330	.0	.4	.6	.1	.1				1.2
339				.1					.1
SUM	.0	2.0	6.2	5.4	.5				14.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.3					.3
324			.1	.1					.2
330									
339									
SUM			.1	.3					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324		.1	.1						.2
330									
339									
SUM		.1	.1	.1					.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.0					.2
324									
330		.1	.2						.3
339									
SUM		.1	.4	.0					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.4					.6
324		.1	.2	.1					.4
330		.1	.2						.3
339									
SUM		.2	.6	.4					1.2

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1			.1					.1
324				.1					.1
330		.0	.0						.1
339									
SUM	.1	.0	.0	.1					.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324									
330					.1				.1
339									
SUM					.1				.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1200. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.1					.2
324				.0					.0
330				.0					.0
339									
SUM			.1	.2					.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.1		.1	.2					.3
324				.1					.1
330		.0	.0	.0	.1				.2
339									
SUM	.1	.0	.1	.3	.1				.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314					.1				.1
324									
330									
339									
SUM					.1				.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1500. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.0	.0					.1
324									
330									
339									
SUM			.0	.0					.1

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. DESCNT. BY RATE OF CLIMB 1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.0	.0	.1				.2
324									
330									
339									
SUM			.0	.0	.1				.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1800. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.2	.1							.3
324									
330			.0						.0
339									
SUM	.2	.1	.0						.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1800. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324									
330		.1	.2	.2					.5
339									
SUM		.1	.2	.2					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1800. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324									
330		.1							.1
339									
SUM		.1							.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1800. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.2	.1							.3
324									
330		.2	.3	.2					.6
339									
SUM	.2	.3	.3	.2					.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1500. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1						.1
324		.1							.1
330									
339									
SUM		.1	.1						.2

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1500. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.3	.3						.7
324		.2	.2	.1					.5
330			.1						.1
339									
SUM		.5	.6	.1					1.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1500. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1						.1
324		.3	.3	.2					.7
330			.3						.3
339									
SUM		.3	.7	.2					1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1500. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1500. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.3	.4	.1					.9
324		.5	.5	.3					1.2
330			.4						.4
339									
SUM		.9	1.3	.3					2.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1200. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1						.1
324			.1						.1
330									
339									
SUM			.2						.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.6	1.0	1.3	.3					3.2
324		.1	.4	.1					.6
330			.1						.1
339									
SUM	.6	1.1	1.9	.3					3.8

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.4	.4	.1					.9
324		.5	.4	.2					1.0
330				.5					.5
339									
SUM		.9	.7	.8					2.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1200. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2		.2					.3
324		.1	.2						.3
330			.1	.1					.2
339									
SUM		.3	.3	.2					.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314	.6	1.6	1.8	.5					4.5
324		.7	1.1	.2					2.0
330			.2	.6					.8
339									
SUM	.6	2.2	3.1	1.3					7.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -900. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314				.1					.1
324				.1					.1
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -900. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.1					.1
324		.1	.1	.1					.4
330									
339									
SUM		.1	.2	.2					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314	.6	4.2	6.7	1.9	.1				13.4
324		.6	1.9	.4					2.9
330			.3						.3
339									
SUM	.6	4.8	8.9	2.3	.1				16.7

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -900, BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314		.2	3.3	.9	.2	.1			4.7
324		.9	2.5	1.3	.1				4.8
330		.1	1.5	.7					2.2
339									
SUM		1.2	7.3	2.9	.2	.1			11.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -900, BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.8	.2					1.0
324			.7	.3	.1				1.1
330				.1					.1
339									
SUM			1.5	.5	.1				2.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -900, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314	.6	4.5	10.9	3.1	.2	.1			19.3
324		1.6	5.3	2.1	.2				9.2
330		.1	1.7	.7					2.6
339									
SUM	.6	6.1	17.9	6.1	.4	.1			31.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600, BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				2.4					2.4
324									
330									
339									
SUM				2.4					2.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600, BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			1.3	.1					1.4
324				.2					.2
330									
339									
SUM			1.3	.4					1.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600, BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			6.2	1.1					7.3
324		.2	2.6	1.6					4.3
330			3.1						3.1
339									
SUM		.2	11.8	2.7					14.7

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.2	.3					.5
314	.1	6.2	44.6	16.3	.3				67.5
324		1.0	14.2	2.7					17.9
330		.1	3.4	.9					4.4
339									
SUM	.1	7.3	62.4	20.2	.3				90.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.4					.4
314		1.6	24.6	7.0	.4	.1			33.7
324		1.0	17.7	2.7					21.4
330		.4	11.0	2.2					13.6
339									
SUM		2.9	53.3	12.3	.4	.1			69.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.1					.1
314		.0	5.4	2.8					8.2
324		.2	2.8	.5					3.5
330			.7						.7
339									
SUM		.2	8.8	3.4					12.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.2	.8					1.0
314	.1	7.9	82.1	29.6	.7	.1			120.5
324		2.3	37.2	7.8					47.3
330		.5	18.2	3.1					21.8
339									
SUM	.1	10.7	137.7	41.3	.7	.1			190.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -300. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				16.1					16.1
324									
330									
339									
SUM				16.1					16.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB -300. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			30.1	18.2					48.3
324			3.6	27.6					31.2
330									
339									
SUM			33.7	45.8					79.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.4	.5					.9
314			197.8	128.6					326.4
324		.1	33.9	63.9					97.8
330			1.1	9.1					10.2
339									
SUM		.1	233.3	202.1					435.4

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			6.6	15.4	1.5				23.5
314		2.6	1481.1	1275.2	5.8	.5			2765.1
324		.3	358.8	362.7	2.5				724.3
330			53.5	65.9					119.4
339									
SUM		2.9	1899.9	1719.2	9.8	.5			3632.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			3.5	13.3	.4				17.2
314		.9	562.8	427.7	14.3				1005.7
324		5.4	338.2	192.5	4.1				540.2
330		1.4	97.2	73.0					171.6
339									
SUM		7.7	1001.7	706.6	18.8				1734.7

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.8	3.6	.3				4.7
314		1.4	147.4	243.4	5.5				397.7
324		.5	56.4	32.8	2.0				91.7
330		.5	19.1	10.1					29.7
339									
SUM		2.4	223.7	290.0	7.8				523.8

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB -300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			11.3	32.9	2.2				46.4
314		5.0	2419.2	2109.2	25.6	.5			4559.4
324		6.2	790.9	679.5	8.6				1485.2
330		1.9	170.9	158.1					330.9
339									
SUM		13.0	3392.2	2979.8	36.4	.5			6421.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY. BY RATE OF CLIMB 300. BY OAT 40

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.4					.4
324									
330									
339									
SUM				.4					.4

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				1.0					1.0
324				.1					.1
330									
339									
SUM				1.1					1.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			1.6	3.2					4.9
324			.1	3.5					3.6
330									
339									
SUM			1.8	6.7					8.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.2	.2					.4
314		.1	25.8	37.2	.5				63.6
324			3.6	7.6					11.3
330		.1	.3	.3					.7
339									
SUM		.2	30.0	45.3	.5				76.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.2	.2					.4
314		.1	8.5	15.6	.6				24.8
324		.1	7.0	8.5	.6				16.2
330			2.9	7.7					10.6
339									
SUM		.2	18.5	31.9	1.2				51.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294				.4					.4
314			2.1	7.4	.2				9.6
324			2.1	.9	.3				3.[illegible]
330			.2	.2					[illegible]
339									
SUM			4.3	8.8	.4				13.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 300. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294			.5	.8					1.2
314		.2	38.0	64.6	1.3				104.2
324		.1	12.8	20.6	.9				34.4
330		.1	3.3	8.2					11.7
339									
SUM		.4	54.7	94.2	2.2				151.5

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2					.2
324									
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.1					.2
324				.2					.2
330									
339									
SUM			.2	.3					.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			2.7	7.2	.1				9.9
324			1.0	1.1					2.0
330				.5					.5
339									
SUM			3.6	8.8	.1				12.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			2.5	5.0	.1				7.6
324			.9	3.1	.1				4.1
330			.6	1.2					1.8
339									
SUM			4.0	9.3	.2				13.5

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.3	.9					1.2
324			.2	.5					.7
330			.1	.1					.2
339									
SUM			.6	1.4					2.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 600. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			5.6	13.4	.2				19.2
324			2.0	4.9	.1				7.0
330			.7	1.8					2.5
339									
SUM			8.4	20.1	.3				28.7

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.2					.2
324									
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT 60

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324				.1					.1
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			1.4	1.1	.5				3.0
324			.1	.4					.5
330				.4					.4
339									
SUM			1.5	1.8	.5				3.9

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.7	1.1					1.8
324			.4	.8					1.2
330		.1		.2					.3
339									
SUM		.1	1.1	2.0					3.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.1	.1				.3
324				.2					.2
330				.0					.0
339									
SUM			.1	.3	.1				.6

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 900. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			2.2	2.4	.7				5.3
324			.5	1.5					2.0
330		.1		.6					.7
339									
SUM		.1	2.7	4.5	.7				8.0

TABLE XII - Continued

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1200. BY OAT 50

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1200. BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.1	.6				.9
324				.1					.1
330									
339									
SUM			.2	.2	.6				1.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1200. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324				.3	.1				.3
330			.3	.3					.6
339									
SUM			.3	.7	.1				1.0

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1200. BY OAT 90

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.1	.1					.2
324									
330									
339									
SUM			.1	.1					.2

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1200. BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314			.2	.4	.6				1.3
324				.3	.1				.4
330			.3	.3					.6
339									
SUM			.5	1.0	.7				2.3

MINUTES FOR TORQUE VS RPM BY MISSION SEG. STEADY, BY RATE OF CLIMB 1800. BY OAT 80

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324				.2					.2
330									
339									
SUM				.2					.2

TABLE XII - Concluded

MINUTES FOR TORQUE VS RPM BY MISSION SFG, STEADY, BY RATE OF CLIMB 1800, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314									
324				.2					.2
330									
339									
SUM				.2					.2

MINUTES FOR TORQUE VS RPM BY MISSION SFG, STEADY, BY RATE OF CLIMB 2100, BY OAT 70

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SFG, STEADY, BY RATE OF CLIMB 2100, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS									
294									
314				.1					.1
324									
330									
339									
SUM				.1					.1

MINUTES FOR TORQUE VS RPM BY MISSION SFG, SUM, BY RATE OF CLIMB SUM, BY OAT SUM

	LESS	10	20	30	40	50	60	70	SUM
LESS	.6	.1			.1				.8
294	3.7	14.4	23.7	81.9	23.7				147.3
314	131.3	669.8	3472.1	3917.6	373.8	1.4			8566.1
324	60.7	357.2	1154.5	1096.9	124.0				2803.4
330	25.1	109.6	264.9	234.4	9.9				644.0
339	.4			.1					.5
SUM	221.8	1151.1	4925.3	5330.8	531.6	1.4			12162.1

TABLE XIII. TIME FOR LONGITUDINAL CYCLIC BOOST TUBE STEADY LOAD VERSUS AIRSPEED BY WEIGHT AND ALTITUDE

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									.7									.7
40										.4	.3							.7
60										.1								.1
65											.1							.1
70																		
75																		
80																		
85																		
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM									.7	.4	.4							1.5

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.2	3.6	54.1	6.5	1.1							65.6
40									15.2	7.0	2.7							25.0
60									3.6	2.4	1.1	.2						7.4
65									2.4	3.3	1.5	1.2						8.4
70									1.1	2.1	5.1	.9						9.1
75									1.5	1.6	2.7	1.7	.1					7.6
80									1.6	2.0	1.9	2.8	.3					8.6
85									1.5	.3	1.9	.8	.8					5.3
90									1.0	.6	1.2	.6	1.0					4.4
95									.1	.4	.2							.8
100											.1	.1						.2
105										.2		.1						.4
110																		
115																		
120																		
SUM							.2	3.6	82.3	26.4	19.6	8.3	2.2					142.6

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-2 0	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									44.5	9.3	1.6							55.4
40									8.3	11.6	11.8	5.0	.1					36.8
60									3.7	7.6	7.3	3.8						22.4
65									2.5	7.3	16.8	2.8	.1					29.4
70									1.6	9.8	19.7	6.8	.0					38.0
75									2.6	10.3	44.4	22.3	2.1					81.7
80									3.9	16.4	71.0	49.5	4.3					149.0
85									9.0	27.5	83.4	58.2	7.3					185.5
90									14.6	45.5	91.5	40.8	6.4					198.8
95									8.1	24.3	38.3	21.6	1.9					94.2
100									.6	3.7	9.1	10.4	.6					24.5
105									.1	.6	1.2	4.2	.0					6.0
110										.3	.2	.6						1.1
115																		
120																		
SUM									99.7	174.2	396.1	225.9	23.0					918.8

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40										1.7	3.2							4.9
60										.4	.5							.9
65										.4	.1							.5
70										.2	.7							.9
75										.2	1.9	2.0						4.1
80										.0	6.2	9.1						15.3
85										.7	43.2	28.2	1.0					73.1
90										2.2	32.4	6.0						40.6
95											9.3	1.9						11.1
100											.1	1.2						1.3
105																		
110																		
115																		
120																		
SUM										5.9	97.5	48.3	1.0					152.8

TABLE XIII - Continued

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.2	3.6	99.4	15.8	2.7							121.7
40									23.6	20.7	18.0	5.0	.1					67.3
60									7.4	10.6	8.9	4.0						30.7
65									4.8	11.0	18.6	4.0	.1					38.4
70									2.7	12.1	25.6	7.6	.0					48.0
75									4.2	12.2	48.9	26.0	2.2					93.4
80									5.5	18.4	79.0	61.4	4.6					168.9
85									10.6	28.5	128.5	87.2	9.2					263.8
90									15.7	48.3	125.1	47.3	7.5					243.8
95									8.2	24.7	47.8	23.5	1.9					106.1
100									.6	3.7	9.3	11.8	.6					26.0
105									.1	.8	1.2	4.3	.0					6.4
110										.3	.2	.6						1.1
115																		
120																		
SUM							.2	3.6	182.7	206.9	513.6	282.5	26.2					1215.7

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									27.3	2.0	.4							29.6
40									1.9	2.0	.8	.0						4.7
60									.4		.3		.0					.7
65									.0	.0	.1							.2
70									.0	.0	.0							.1
75									.1	.2	.0							.3
80											.1							.1
85										.0	.3	.0						.3
90										.3	.2	.0						.6
95										2.1	3.0							5.2
100										.1	4.1	.0						4.3
105																		
110																		
115																		
120																		
SUM									29.8	6.8	9.4	.2	.0					46.2

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.2	3.9	302.8	42.8	7.8	.7	.8					359.0
40									48.6	55.7	20.1	6.6	1.3	.7				133.1
60									7.9	18.9	11.0	4.0	.3	.3				42.4
65									5.9	21.3	12.6	4.1	.6	.4				44.9
70									4.6	15.0	18.8	3.9	.5	.1				42.9
75									3.0	15.2	17.0	7.9	1.6	.1				44.8
80									2.1	10.8	15.1	10.0	2.2	.4				40.6
85									1.5	7.1	8.6	17.9	8.4	1.1				44.5
90									.7	5.3	10.3	7.0	2.4	1.1		.0		26.9
95									.6	1.4	5.3	3.4	3.9	1.1				15.6
100										.3	1.6	1.9	2.2	.4				6.3
105										.1	.9	1.7	3.0	.2				5.9
110									.1	.2	.2	.5	.7	.4				2.1
115										.0		.0						.1
120																		
SUM							.2	3.9	377.7	194.2	129.3	69.6	27.9	6.4		.0		809.3

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								.1	154.4	27.7	13.0	.3						195.4
40									30.8	89.2	57.2	13.7	1.1	.3				192.3
60									8.7	65.4	43.2	19.7	.4	.6				138.1
65									10.1	66.3	56.4	31.4	1.4	.8				166.4
70									7.4	82.7	89.7	31.4	2.3	2.3	.1			215.8
75									9.2	124.9	130.1	67.1	5.0	1.7				338.1
80									6.7	182.5	294.6	167.0	15.3	3.5				669.7
85									18.5	227.5	468.0	227.7	39.6	7.4				988.7
90									32.5	271.6	632.6	150.7	31.8	5.9	.2			1125.3
95									20.0	131.8	303.7	50.5	13.0	.5				519.6
100									5.4	45.8	80.8	15.0	6.0	.0				153.0
105									.0	11.6	12.3	4.2	1.6					29.8
110									.8	7.9	1.9	.9	.1					11.6
115										1.0								1.0
120																		
SUM								.1	304.3	1336.1	2183.5	779.7	117.6	23.1	.3			4744.7

TABLE XIII - Continued

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS											.1							.1
40										1.9	1.9	.1						3.9
60										.3	1.2							1.6
65										.4	3.2	2.9						6.5
70										.9	2.8	2.8						6.5
75										2.2	7.4	3.3						12.9
80										2.5	17.0	10.5						29.9
85									.1	1.8	18.7	18.0						38.7
90										7.9	6.2	16.0						30.1
95										8.0	1.6	4.3						13.9
100										3.2	1.3	.1	.1					4.6
105										.0								.0
110																		
115																		
120																		
SUM									.1	29.2	61.4	57.9	.1					148.7

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40									1.7	.5	.0							2.3
60										.1								.1
65										.6	.3							.9
70											.5							.5
75											.3							.3
80											4.4							4.4
85											2.3							2.3
90												1.2						1.2
95												1.2						1.2
100																		
105																		
110																		
115																		
120																		
SUM									1.7	1.2	7.8	2.4						13.1

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.2	4.0	484.5	72.5	21.2	.9	.8					584.1
40									83.1	149.3	80.1	20.5	2.4	1.0				336.3
60									16.9	84.9	55.8	23.7	.7	.9				182.9
65									16.0	88.6	72.7	38.4	2.0	1.2				219.0
70									12.0	98.7	111.8	38.1	2.8	2.4	.1			265.8
75									12.3	142.6	154.8	78.3	6.6	1.9				396.4
80									8.8	195.8	331.2	187.5	17.6	3.9				744.7
85									20.1	236.5	497.8	263.7	47.9	8.5				1074.5
90									33.2	285.1	649.3	174.9	34.2	7.1	.2	.0		1184.1
95									20.6	143.3	313.6	59.3	16.9	1.6				555.4
100									5.4	49.4	87.9	17.0	8.3	.4				168.3
105									.0	11.8	13.1	5.9	4.6	.2				35.8
110									.9	8.1	2.0	1.4	.8	.4				13.6
115										1.0		.0						1.1
120																		
SUM							.2	4.0	713.6	1567.5	2391.5	909.8	145.6	29.5	.3	.0		5762.1

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								.7	33.8	2.4	.5	.1						37.5
40									2.2	2.3	.6	.2						5.3
60									.2	.9	.5	.1						1.8
65										.3	.3	.1						.6
70										.1		.1						.2
75										.1	.1							.2
80										.1	.0							.1
85											.0							.0
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM								.7	36.2	6.2	2.1	.7						45.9

TABLE XIII - Continued

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								1.2	219.9	31.3	5.6	1.5	.3					259.7
40									34.2	54.2	18.8	3.7	.3					111.2
60									5.9	22.6	12.6	5.1	1.1					47.3
65									4.0	21.1	14.6	4.9	.5					45.1
70									3.6	17.7	12.4	6.0	.6		.0			40.3
75									2.9	14.9	12.9	3.3	1.3	.0				35.5
80									1.6	13.9	16.4	4.9	1.0	.3				38.1
85									.9	11.6	16.6	8.2	2.8	.1				40.2
90									.4	8.2	18.6	4.1	.9					32.3
95									.1	2.5	7.4	2.0	1.2	.0				13.2
100										.6	3.4	.8	.4					5.2
105												1.1	1.6	.1	.0			2.9
110												.5	.8					1.3
115												.4	.1	.1				.5
120																		
SUM								1.2	273.5	198.6	139.4	46.5	13.0	.6	.1			672.9

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								.9	157.1	28.5	6.1	.4						193.0
40									32.7	95.1	48.1	28.5	.7					205.1
60									7.2	75.0	44.8	16.0	.7					143.6
65									9.8	77.3	48.9	24.5	1.9	.2				162.7
70									6.7	103.8	68.0	25.4	2.9	.1				206.8
75									8.4	134.9	120.5	38.6	10.3	.6				313.3
80									6.9	214.0	273.6	87.3	26.7	.5				609.0
85									7.0	298.4	477.8	157.4	35.8	1.1				977.4
90									10.6	347.8	409.3	100.2	29.6	.4				897.9
95									2.1	202.1	200.5	35.6	16.0		.0			456.3
100										41.8	43.1	5.1	1.7					91.8
105										6.1	3.6	.2	.1					10.1
110										.1	.9	.4						1.4
115												.1						.1
120																		
SUM								.9	248.3	1625.0	1745.1	519.8	126.4	2.9	.0			4268.4

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS										.2								.2
40									.2	1.7	2.6							4.5
60									.1	.3	3.0	.1						3.5
65									.1	2.4	7.5	.4						10.4
70										1.8	2.2							4.0
75										3.2	6.1	1.9						11.1
80										7.0	14.8	1.5	1.0					24.3
85										30.6	19.6	14.4	.5					65.0
90										19.4	13.2	10.5	.1					43.2
95										9.6	5.3	2.4						17.3
100										.8	.5	.2						1.5
105												.1						.1
110												.2						.2
115																		
120																		
SUM									.4	76.9	74.9	31.6	1.5					185.3

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40																		
60																		
65																		
70																		
75																		
80											.8							.8
85											6.0	2.3						8.3
90											.2	2.4						2.6
95												.1						[illegible]
100																		
105																		
110																		
115																		
120																		
SUM											7.0	4.8						11.8

TABLE XIII - Concluded

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								2.8	410.8	62.4	12.2	2.0	.3					490.4
40									69.2	153.4	70.2	32.3	1.0					326.1
60									13.4	98.8	60.9	21.4	1.7					196.3
65									13.8	101.1	71.3	30.0	2.4	.2				218.8
70									10.2	123.4	82.6	31.6	3.4	.1	.0			251.4
75									11.3	193.1	139.6	43.8	11.7	.6				360.2
80									8.5	235.1	305.6	93.6	28.6	.8				672.3
85									7.9	340.5	520.0	182.3	39.1	1.1				1091.0
90									11.0	375.4	441.3	117.1	30.6	.4				975.8
95									2.2	214.2	213.3	40.1	17.2	.0	.0			487.0
100										43.2	47.1	6.1	2.2					98.6
105										6.1	3.6	1.4	1.8	.1	.0			13.0
110										.1	.9	1.0	.8					2.8
115												.5	.1	.1				.6
120																		
SUM								2.8	558.3	1906.7	1968.6	603.4	141.0	3.5	.1			5184.3

MINUTES FOR CYCLIC LONG VS AIRSPEED BY WEIGHT SUM, BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.4	10.4	994.7	150.7	36.1	2.9	1.1					1196.3
40									175.8	323.3	168.3	57.8	3.5	1.0				729.7
60									37.7	194.2	125.5	49.1	2.5	.9				409.9
65									34.6	200.7	162.5	72.4	4.5	1.4				476.1
70									25.0	234.2	220.0	77.3	6.2	2.5	.1			565.2
75									27.8	307.9	343.3	148.1	20.5	2.5				850.0
80									22.8	449.2	715.8	342.5	50.9	4.8				1585.9
85									38.5	605.5	1146.3	533.1	96.2	9.7				2429.4
90									59.8	708.8	1215.7	339.4	72.3	7.4	.2	.0		2403.7
95									30.9	382.2	574.7	123.0	35.9	1.7	.0			1148.5
100									6.0	96.3	144.3	34.9	11.1	.4				292.9
105									.1	18.7	17.9	11.7	6.4	.3	.0			55.2
110									.9	8.5	3.1	3.0	1.6	.4				17.5
115										1.0		.5	.1	.1				1.7
120																		
SUM							.4	10.4	1454.6	3681.1	4873.6	1795.6	312.8	33.0	.4	.0		12162.1

TABLE XIV. TIME FOR LATERAL CYCLIC BOOST TUBE STEADY LOAD VERSUS AIRSPEED BY WEIGHT AND ALTITUDE

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								.1	.6									.7
40									.7									.7
60									.1									.1
65									.1									.1
70																		
75																		
80																		
85																		
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM								.1	1.4									1.5

TABLE XIV - Continued

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							2.5	9.3	53.8									65.6
40							1.7	4.8	18.4									25.0
60							.2	.9	6.3									7.4
65							.1	1.3	6.9									8.4
70							.3	1.5	7.3									9.1
75							.1	1.9	5.5									7.6
80							.1	3.9	4.6									8.6
85								1.8	3.5									5.3
90							.1	.6	3.6									4.4
95									.8									.8
100								.1	.1									.2
105									.4									.4
110																		
115																		
120																		
SUM							5.2	26.2	111.2									142.6

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							1.5	11.7	42.2	.0								55.4
40							.6	12.4	23.8									36.8
60							.3	6.9	15.2									22.4
65							.9	8.8	19.7									29.4
70							1.9	12.6	23.5									38.0
75							4.6	35.9	41.2									81.7
80						.0	6.2	55.4	83.4									145.0
85							5.4	45.1	134.9									185.5
90							1.6	15.0	182.2									198.8
95							.3	8.9	85.1									94.2
100							.2	1.0	23.3									24.5
105						.0		.2	5.8									6.0
110									1.1									1.1
115																		
120																		
SUM						.1	23.3	214.0	681.4	.0								918.8

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40									4.9									4.9
60									.9									.9
65									.5									.5
70									.9									.9
75									4.1									4.1
80									15.3									15.3
85									73.1									73.1
90									40.6									40.6
95									11.1									11.1
100									1.3									1.3
105																		
110																		
115																		
120																		
SUM									152.8									152.8

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							4.0	21.2	96.5	.0								121.7
40							2.3	17.3	47.8									67.3
60							.5	7.8	22.5									30.7
65							1.0	10.1	27.2									38.4
70							2.2	14.1	31.8									48.0
75							4.7	37.9	50.8									93.4
80						.0	6.3	59.3	103.3									168.9
85							5.4	46.9	211.5									263.8
90							1.7	15.7	226.5									243.8
95							.3	8.9	97.0									106.1
100							.2	1.0	24.7									26.0
105						.0		.2	6.2									6.4
110									1.1									1.1
115																		
120																		
SUM						.1	28.5	240.3	946.7	.0								1215.7

TABLE XIV - Continued

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS				.4	.1	3.2	2.9	5.5	17.4	.1								29.6
40						.7	.6	2.0	1.4									4.7
60						.0	.2	.4	.0									.7
65						.0			.1									.2
70							.0	.0	.0									.1
75							.0	.2	.1									.3
80									.1									.1
85								.2	.2									.3
90								.5	.1									.6
95								4.9	.3									5.2
100							.0	4.1	.2									4.3
105																		
110																		
115																		
120																		
SUM				.4	.1	4.0	3.8	17.9	20.0	.1								46.2

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS			.7	.9	.1	.9	14.9	71.8	269.8									359.0
40			.2	.6	.3	.9	8.6	35.4	87.2									133.1
60				.3	.2	.3	3.2	10.4	28.0									42.4
65				.3	.0	.3	1.8	10.9	31.6									44.9
70				.6	.0	.7	2.1	11.2	28.2									42.9
75				.6	.1	.2	2.7	12.4	28.8									44.8
80			.1	.4	.0	.6	2.3	9.8	27.4									40.6
85				1.4	.2	.2	1.9	9.5	31.3									44.5
90				1.1	.1	.1	.2	6.6	18.6									26.9
95						.1	.2	3.5	11.8									15.6
100							.1	.4	5.9									6.3
105									5.9									5.9
110								.1	2.0									2.1
115									.1									.1
120																		
SUM			.9	6.2	1.1	4.3	38.1	182.1	576.6									809.3

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS						.6	9.7	39.1	146.0									195.4
40							4.6	39.7	148.1									192.3
60						.1	1.9	26.9	109.2									138.1
65						.0	3.9	26.8	135.7									166.4
70						.2	4.4	31.7	179.5									215.8
75						.2	5.1	63.2	269.6									338.1
80					.2	.4	9.5	89.2	570.4									669.7
85					.7	1.1	17.2	124.9	844.8									988.7
90				.4	3.4	3.5	15.0	120.0	983.0									1125.3
95				.2	3.9	1.4	5.3	45.1	463.8									519.6
100					1.7	.7	.3	7.9	142.4									153.0
105					.1			.6	29.2									29.8
110								.4	11.2									11.6
115								.7	.3									1.0
120																		
SUM				.6	10.0	8.0	76.8	616.2	4033.2									4744.7

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									.1									.1
40									3.9									3.9
60								.3	1.3									1.6
65								.4	6.1									6.5
70								.3	6.2									6.5
75								1.6	11.3									12.9
80								6.4	23.5									29.9
85								4.4	34.3									38.7
90								.6	29.5									30.1
95									13.9									13.9
100								.0	4.6									4.6
105								.0										.0
110																		
115																		
120																		
SUM								14.1	134.6									148.7

TABLE XIV - Continued

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40									2.3									2.3
60									.1									.1
65									.9									.9
70									.5									.5
75									.3									.3
80									4.4									4.4
85									2.3									2.3
90									1.2									1.2
95									1.2									1.2
100																		
105																		
110																		
115																		
120																		
SUM									13.1									13.1

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS			.7	1.3	.2	4.7	27.5	116.4	433.2	.1								584.1
40			.2	.6	.3	1.6	13.8	77.1	242.8									336.3
60				.3	.2	.4	5.3	38.1	138.6									182.9
65				.3	.0	.4	5.7	38.1	174.5									219.0
70				.6	.0	.9	6.5	43.3	214.3									265.8
75				.6	.1	.4	7.9	77.4	310.2									396.4
80			.1	.4	.3	1.0	11.8	105.4	625.9									744.7
85				1.4	.8	1.2	19.1	139.0	912.9									1074.5
90				1.6	3.5	3.6	15.2	127.8	1032.4									1184.1
95				.2	3.9	1.4	5.4	53.5	491.0									555.4
100					1.7	.7	.5	17.4	153.0									168.3
105					.1			.6	35.1									35.8
110								.5	13.2									13.6
115								.7	.4									1.1
120																		
SUM			.9	7.2	11.2	16.3	118.7	830.2	47[illegible]7.5	.1								5762.1

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS						.1	3.6	15.4	18.4									37.5
40							.7	3.3	1.2									5.3
60						.2	.1	.7	.8									1.8
65								.2	.4									.6
70								.1	.1									.2
75								.1	.1									.2
80									.1									.1
85								.0										.0
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM						.3	4.4	19.9	21.3									45.9

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS						1.0	13.8	43.0	201.9	.1								259.7
40					.1	.7	7.0	25.8	77.6									111.2
60						.4	2.6	9.1	35.2									47.3
65					.0		3.5	8.0	33.5									45.1
70					.0	.3	2.3	8.3	29.3									40.3
75					.0	.2	2.5	10.9	21.8									35.5
80						1.3	1.8	10.0	25.1									38.1
85						.6	1.7	10.3	27.6									40.2
90						.1	1.1	7.5	23.5									32.3
95							.3	2.4	10.5									13.2
100							.1	.6	4.5									5.2
105								.2	2.6									2.9
110									1.3									1.3
115									.5									.5
120																		
SUM					.2	4.6	36.9	136.1	495.0	.1								672.9

TABLE XIV - Continued

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS						.8	8.7	31.8	151.6									193.0
40						.7	8.7	34.8	160.9									205.1
60						.2	4.3	15.9	123.2									143.6
65						.5	3.5	22.6	136.1									162.7
70						1.0	4.0	27.3	174.5									206.8
75						.5	4.4	53.0	255.2	.3								313.3
80					.9	.7	3.9	83.2	520.2									609.0
85					3.6	3.7	6.6	106.2	857.2		.1							977.4
90					1.8	4.3	5.1	93.4	793.2									897.9
95					.4	.3	3.8	32.8	418.6	.4								456.3
100						.0	.9	3.5	87.3									91.8
105							.0	.1	9.9									10.1
110									1.4									1.4
115									.1									.1
120																		
SUM					6.7	13.0	53.9	504.6	3689.5	.7	.1							4268.4

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									.2									.2
40									4.5									4.5
60								.0	3.5									3.5
65								.3	10.1									10.4
70								.1	3.9									4.0
75							.0	.7	10.3									11.1
80									24.3									24.3
85								.2	64.8									65.0
90								.3	42.9									43.2
95								.4	16.9									17.3
100								.4	1.1									1.5
105									.1									.1
110									.2									.2
115																		
120																		
SUM							.0	2.5	182.8									185.3

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40																		
60																		
65																		
70																		
75																		
80									.8									.8
85									8.3									8.3
90									2.6									2.6
95									.1									.1
100																		
105																		
110																		
115																		
120																		
SUM									11.8									11.8

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS						1.9	26.1	90.2	372.1	.1								490.4
40					.1	1.4	16.4	64.0	244.2									326.1
60						.8	7.0	25.7	162.8									196.3
65					.0	.5	7.0	31.1	180.1									218.8
70					.0	1.3	6.3	35.8	207.9									251.4
75					.0	.7	6.9	64.8	287.4	.3								360.2
80					.9	2.0	5.7	93.2	570.5									672.3
85					3.6	4.3	8.3	116.7	958.0		.1							1091.0
90					1.8	4.4	6.3	101.2	862.2									975.8
95					.4	.3	4.1	35.6	446.1	.4								487.0
100						.0	1.0	4.5	93.0									98.6
105							.0	.3	12.6									13.0
110									2.8									2.8
115									.6									.6
120																		
SUM					6.9	17.8	95.2	663.1	4400.4	.8	.1							5184.3

TABLE XIV - Concluded

MINUTES FOR CYCLIC LAT VS AIRSPEED BY WEIGHT SUM, BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS			.7	1.3	.2	6.7	57.6	227.8	901.9	.2								1196.3
40			.2	.6	.4	3.0	32.5	158.4	534.8									729.7
60				.3	.2	1.2	12.8	71.6	323.9									409.9
65				.3	.1	.9	13.7	79.3	381.9									476.1
70				.6	.1	2.3	15.0	93.2	454.0									565.2
75				.6	.2	1.1	19.5	180.0	648.4	.3								850.0
80			.1	.4	1.2	3.1	23.7	257.8	1299.7									1585.9
85				1.4	4.4	5.5	32.9	302.6	2082.4		.1							2429.4
90				1.6	5.3	8.0	23.2	244.7	2121.0									2403.7
95				.2	4.2	1.8	9.8	98.0	1034.1	.4								1148.5
100					1.7	.7	1.7	18.0	270.8									292.9
105					.1	.0	.0	1.1	53.9									55.2
110								.5	17.1									17.5
115								.7	1.0									1.7
120																		
SUM			.9	7.2	18.1	34.2	242.5	1733.6	10124.6	.9	.1							12162.1

TABLE XV. TIME FOR COLLECTIVE BOOST TUBE STEADY LOAD VERSUS AIRSPEED BY WEIGHT AND ALTITUDE

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 6000, BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS									.6			.1						.7
40									.3				.4					.7
60												.1						.1
65												.1						.1
70																		
75																		
80																		
85																		
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM									.9			.3	.4					1.5

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 6000, BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.4	2.5	56.5	4.3	1.2	.4	.2					65.6
40								2.2	11.3	3.6	3.7	2.6	.6	.4	.3	.3		25.0
60								.3	4.0	1.0	.7	.6	.4	.1	.1	.1	.1	7.4
65								.2	4.5	1.0	1.2	.9	.4		.1			8.4
70								.1	4.7	1.1	2.2	.8	.1		.1			9.1
75									3.0	2.1	1.9	.4	.2	.0	.1			7.6
80									5.5	1.7	.9	.0	.4					8.6
85									3.9	.7	.6	.1						5.3
90									4.0	.1	.2	.1						4.4
95									.7	.0								.8
100									.2									.2
105									.1	.2								.4
110																		
115																		
120																		
SUM							.4	5.3	98.4	16.0	12.5	6.0	2.3	.5	.7	.4	.1	142.6

TABLE XV - Continued

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							1.0	3.4	47.6	1.2	1.3	.4	.2	.3				55.4
40							1.6	5.3	20.5	1.9	2.6	2.2	1.7	.2	.1	.3	.4	36.8
60							1.0	3.9	12.1	1.4	1.1	1.7	.6	.3		.0	.3	22.4
65						.1	.1	3.0	20.0	1.4	2.5	1.4	.2	.2			.6	29.4
70						.7	.3	3.8	26.0	2.1	1.9	1.6	.2	.8		.0	.6	38.0
75						.1	1.4	1.6	62.9	5.1	5.8	2.1	1.3	.4	.1	.1	.7	81.7
80							.2	2.4	118.4	12.8	7.5	1.3	1.5			.1	1.0	145.0
85								4.3	150.7	19.8	5.9	3.0	1.0	.2	.1		.5	185.5
90							.1	2.4	179.6	10.9	3.3	2.0	.4	.1	.1	.0		198.8
95								2.0	82.0	7.6	2.1	.4		.1				94.2
100								.6	21.5	1.4	.6			.1		.1	.1	24.5
105									5.4	.1	.1			.4			.0	6.0
110									.9	.2								1.1
115																		
120																		
SUM						1.0	5.7	32.4	747.5	65.9	34.8	16.1	7.0	3.2	.4	.7	4.2	918.8

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40							.3	4.7										4.9
60							.0	.8	.0									.9
65							.1	.3	.1									.5
70							.1	.2	.6									.9
75							1.1	.1	2.9	.0								4.1
80							3.9	2.3	8.5	.5								15.3
85							17.8	7.0	47.6	.7								73.1
90							17.8	12.0	10.9									40.6
95							2.9	2.7	5.5									11.1
100							.1		1.2									1.3
105																		
110																		
115																		
120																		
SUM							44.1	30.1	77.3	1.3								152.8

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 6000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							1.4	5.9	104.7	5.6	2.5	1.0	.4	.3				121.7
40							1.8	12.2	32.0	5.5	6.3	4.8	2.7	.6	.4	.6	.4	67.3
60							1.0	5.0	16.1	2.3	1.9	2.4	.9	.5	.1	.1	.4	30.7
65						.1	.2	3.5	24.6	2.4	3.7	2.4	.7	.2	.1		.6	38.4
70						.7	.4	4.1	31.4	3.2	4.1	2.5	.3	.8	.1	.0	.6	48.0
75						.1	2.5	1.7	68.7	7.2	7.7	2.5	1.4	.5	.2	.1	.7	93.4
80							4.2	4.7	132.4	15.0	8.4	1.3	1.9			.1	1.0	168.9
85							17.8	11.2	202.2	21.2	6.4	3.2	1.0	.2	.1		.5	263.8
90							17.8	14.4	194.4	11.1	3.5	2.0	.4	.1	.1	.0		243.8
95							2.9	4.7	88.2	7.6	2.1	.4		.1				106.1
100							.1	.6	22.9	1.4	.6			.1		.1	.1	26.0
105									5.5	.4	.1			.4			.0	6.4
110									.9	.2								1.1
115																		
120																		
SUM						1.0	50.1	67.8	924.1	83.2	47.3	22.4	9.7	3.8	1.0	1.1	4.3	1215.7

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								1.0	26.9	.9	.5	.1	.1					29.6
40								.1	2.3	.2	.5	.9	.3	.1	.3			4.7
60									.3		.1	.3			.1			.7
65									.1	.0								.2
70									.0		.0	.0						.1
75									.1	.2	.0	.0						.3
80									.1									.1
85									.3		.0							.3
90									.6		.0							.6
95									5.1	.0								5.2
100									4.3		.0							4.3
105																		
110																		
115																		
120																		
SUM								1.1	40.1	1.4	1.3	1.4	.5	.1	.4			46.2

TABLE XV - Continued

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS				.1	.5	3.3	10.2	46.2	277.1	12.3	6.2	2.3	.6	.3				359.0
40						1.1	1.8	9.3	68.2	16.4	16.8	13.6	4.7	.8	.2	.3		133.1
60							.6	3.3	23.3	4.6	5.1	2.4	2.1	.5	.3	.2		42.4
65							.4	3.7	27.0	3.3	4.4	3.1	2.1	.4	.0		.4	44.9
70							.5	2.9	25.3	5.5	3.8	2.5	1.7	.5	.0	.0	.1	42.9
75								1.2	26.2	6.7	5.8	3.3	1.1	.5		.1	.0	44.8
80							.2	.8	26.9	6.7	3.4	1.7	.4	.3	.0	.0		40.6
85								.3	32.2	6.8	3.2	1.4	.4	.1	.1	.0		44.5
90								.4	20.2	2.7	1.5	1.9	.1	.0			.1	26.9
95								1.2	11.7	.8	1.4	.3		.1			.1	15.6
100							.2	1.2	4.8	.0	.1	.0			.1			6.3
105							.2	3.5	2.2									5.9
110							.1	.5	1.0	.2	.3							2.1
115									.0	.0								.1
120																		
SUM				.1	.5	4.4	14.1	74.5	546.1	66.1	52.1	32.4	13.1	3.6	.8	.7	.7	809.3

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS					.3	2.0	8.7	33.8	139.3	6.4	3.7	.7	.5					195.4
40					.2	.7	10.6	37.1	108.0	10.0	9.3	10.4	3.4	1.3	.4	.1		192.3
60				.5	1.0	1.5	8.5	21.4	86.6	4.7	5.3	3.7	3.3	1.2	.2	.1		138.1
65					.3	1.7	6.4	24.9	112.2	7.8	5.5	5.5	.8	.9	.3		.1	166.4
70					.5	1.6	8.0	21.5	150.6	13.2	11.4	4.8	2.9	.9	.2	.1	.2	215.8
75						.8	7.1	31.7	250.3	22.3	14.9	8.9	1.4	.4	.3	.1	.1	338.1
80							3.2	47.7	555.3	30.4	20.0	8.0	2.8	1.1	.7	.2	.3	669.7
85							2.5	35.4	879.0	36.5	19.0	9.6	4.0	1.6	.2	.1	.8	988.7
90							.8	41.0	1008.8	42.9	20.9	6.9	2.5	.6	.6	.1	.2	1125.3
95							.2	26.1	459.0	18.4	11.7	2.0	1.3	.4	.2	.2		519.6
100							.3	11.8	128.2	6.8	4.3	1.5	.2					153.0
105							.2	1.4	26.6	1.6	.1							29.8
110						.1		.2	10.7	.5		.1						11.6
115									1.0									1.0
120																		
SUM				.5	2.3	8.4	56.4	333.8	3916.3	201.4	126.3	62.2	22.9	8.3	3.1	1.0	1.7	4744.7

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.1											.1
40			1.6	.4		.3	.3	.2	1.1									3.9
60			.3	.4		.1	.1		.5	.2								1.6
65			.3			.3	1.6	.7	3.0	.1	.2						.4	6.5
70						.1	1.4	2.6	1.1	.5	.4						.4	6.5
75							2.2	4.5	4.5	.8				.4	.3		.4	12.9
80						.8	3.0	4.8	19.4	1.6				.3				29.9
85						.9	3.4	5.2	28.1	.4	.2			.5				38.7
90							2.2	10.0	16.7	.5	.2	.1	.3					30.1
95					.4		.2	5.7	6.2		.0		1.3					13.9
100						1.2		2.6	.7				.1					4.6
105								.0										.0
110																		
115																		
120																		
SUM			2.2	.7	.4	3.7	14.5	36.4	81.0	4.2	1.1	.1	1.7	1.2	.3		1.1	148.7

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40		.1	1.7			.1	.1	.3			.1							2.3
60								.0			.1							.1
65								.2				.7						.9
70								.1	.1			.3						.5
75						.3												.3
80						4.1						.3						4.4
85						1.7						.6						2.3
90						1.2												1.2
95						1.2												1.2
100																		
105																		
110																		
115																		
120																		
SUM		.1	1.7			8.5	.1	.5	.1		.2	1.9						13.1

TABLE XV - Continued

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 7000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS				.1	.8	5.3	10.7	81.0	443.3	[illegible]	10.4	3.2	1.3	.3				584.1
40		.1	3.3	.4	.2	2.2	12.7	47.0	180.4	26.5	26.7	24.9	8.3	2.2	.9	.4		336.3
60			.3	.9	1.0	1.7	9.2	24.7	110.7	[illegible]	10.6	6.4	5.4	1.7	.5	.3		182.9
65			.3		.3	2.0	8.4	29.5	142.3	[illegible]	10.2	9.3	2.9	1.4	.4		.9	219.0
70					.5	1.6	10.0	27.0	177.1	[illegible]	15.7	7.6	4.6	1.4	.2	.1	.7	265.8
75						1.1	9.3	37.5	281.0	[illegible]	20.7	12.2	2.4	1.2	.6	.2	.5	396.4
80						4.9	[illegible]	53.3	601.6	[illegible]	23.5	10.0	3.2	1.8	.7	.2	.3	744.7
85						2.6	5.8	40.9	939.5	43.8	22.5	11.6	4.3	2.2	.4	.2	.8	1074.5
90						[illegible]	3.0	[illegible]	1046.3	46.1	22.8	8.9	2.9	.6	.6	.1	.3	1184.1
95					.4	1.2	.4	12.9	482.1	19.2	13.2	[illegible]	2.6	.5	.2	.2	.1	555.4
100						1.2	.4	15.5	137.9	6.8	4.5	1.5	.3		.1			168.3
105							.4	4.9	28.7	1.6	.1							35.8
110						.1	.1	.7	11.7	.7	.3	.1						13.6
115									1.0	.0								1.1
120																		
SUM		.1	3.9	1.3	3.2	25.1	85.1	445.4	4583.6	273.1	181.0	98.0	38.2	13.3	4.5	1.7	3.5	5762.1

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE LESS

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS								1.0	[illegible]	1.0	.4	2.1	.2					37.5
40								.1	3.9	.4	.3	.5		.1				5.3
60									1.3	.2					.1			1.8
65									[illegible]	.1								.6
70									.1	.1								.2
75									.2									.2
80									.1									.1
85									.0									.0
90																		
95																		
100																		
105																		
110																		
115																		
120																		
SUM								1.1	39.3	1.8	.7	2.7	.2	.1	.1			45.9

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 1000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS					1.0	1.5	15.5	43.0	186.1	8.0	3.9	.7	.1		.1			259.7
40						.2	2.3	10.7	62.6	12.5	10.0	8.8	3.1	1.0		.0		111.2
60						.0	1.4	5.4	27.8	5.6	3.8	3.9	1.2	.1	.1			47.3
65						.0	.2	4.6	27.6	3.7	4.2	2.9	1.6	.4			.0	45.1
70						.0	.3	4.5	26.6	3.4	3.3	1.4	.5	.1	.1			40.3
75							.0	1.2	21.9	4.2	3.8	2.3	2.0	.0				35.5
80							.1	.9	25.9	4.6	3.7	1.9	.2	.6	.2			38.1
85								.4	26.9	7.7	3.4	1.0	.6	.1				40.2
90								.3	27.5	2.3	1.6	.6	.0					32.3
95							.1	.6	10.9	.8	.6	.2	.0					13.2
100								.5	4.2	.5	.1							5.2
105							.3	1.5	1.0	.1								2.9
110						.1	.3	.5	.4									1.3
115							.1	.3	.1									.5
120																		
SUM					1.0	1.9	20.5	74.3	449.5	51.5	38.3	23.7	9.3	2.3	.4	.0	.0	672.9

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 2000

	LESS	-450	-400	-350	-300	-250	-200	-150	-170	100	150	200	250	300	350	400	450	SUM
LESS			.4			.5	7.6	27.4	147.5	4.1	2.8	.7						193.0
40				.2	1.1	1.4	13.3	26.3	133.1	7.5	9.9	7.4	3.9	.8	.1	.1		205.1
60						.8	7.9	23.6	97.6	4.6	2.8	4.0	1.3	1.0	.1	.1		143.6
65						.9	6.0	25.1	113.1	4.7	6.6	3.4	1.8	.2				162.7
70						.6	3.4	23.2	159.8	7.6	6.1	3.7	1.3	.6	.1	.3		206.8
75						.3	3.2	24.3	240.7	13.5	23.2	5.5	1.3	.3	.2		.3	313.3
80						.3	3.4	16.8	531.4	30.9	16.5	5.9	2.4	.6	.5		.2	609.0
85						.2	4.2	19.8	887.9	31.1	22.6	6.9	2.8	.6	1.2		.1	977.4
90							3.0	33.1	813.2	19.0	19.3	8.1	2.0	.2		.1		897.9
95							11.6	36.9	380.6	14.2	8.6	2.9	1.2	.2				456.3
100							1.4	11.4	71.9	3.4	3.5	.3	.0					91.8
105								.5	8.8	.6	.1		.1					10.1
110								.1	1.1	.1		.1						1.4
115										.1								.1
120																		
SUM			.4	.2	1.1	5.1	64.9	271.4	3586.7	141.3	121.9	48.8	18.2	5.2	2.2	.6	.5	4268.4

TABLE XV - Concluded

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 5000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS							.2											.2
40						.5	2.3	1.3	.2	.1	.1							4.5
60						.9	2.0	.1	.3	.1	.1					.0		3.5
65					.2	3.1	2.9	1.8	2.2	.1	.1					.0		10.4
70					.3	.6	.9	.2	2.0	.1	.0							4.0
75						1.2	3.0	.9	5.8	.0	.0					.0		11.1
80						3.8	2.0	4.6	13.4	.2	.2							24.3
85						6.0	4.0	3.5	49.6	.3	.7	.2	.1	.7		.0		65.0
90						[illegible]	.2	4.7	29.2	.9	.7	1.3						43.2
95					.1	[illegible]	.1	6.5	7.4	.1	1.6	.1						17.3
100								.1	.7	.5	.1							1.5
105											.1							.1
110											.2							.2
115																		
120																		
SUM					[illegible]	[illegible]	17.6	23.9	110.9	2.4	3.9	1.7	.1	.7		.1		105.3

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE 10000

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
40																		
60																		
65																		
70																		
75																		
80						.8												.8
85					3.9	4.4												8.3
90					2.1	.5												2.6
95						.1	.1											.1
100																		
105																		
110																		
115																		
120																		
SUM					6.0	5.7	.1											11.8

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT 8000. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS			.4		1.0	2.1	23.3	73.3	366.4	13.0	7.1	3.5	.3		.1			490.4
40				.2	1.1	2.1	17.9	38.4	199.8	20.5	20.2	16.8	7.0	1.8	.1	.1		326.1
60						1.7	11.2	29.1	127.2	8.5	6.7	7.8	2.5	1.1	.3	.1		196.3
65					.2	4.0	9.1	32.5	143.4	8.5	10.8	6.2	3.4	.6		.0	.0	218.8
70					.3	1.2	4.5	27.9	188.6	11.2	9.4	5.1	1.8	.7	.3	.3		251.4
75						1.6	6.2	26.4	268.6	17.7	27.1	7.8	3.3	.9	.2	.0	.3	360.2
80						4.9	5.5	22.3	570.9	35.8	20.5	7.8	2.7	1.2	.6		.2	672.3
85					3.9	10.6	8.2	23.7	964.5	39.1	26.7	8.2	3.4	1.4	1.2	.0	.1	1091.0
90					2.1	6.5	3.2	38.0	869.9	22.2	21.6	10.0	2.0	.2		.1		975.8
95					.1	1.4	11.8	44.0	399.0	15.2	10.8	3.2	1.3	.2				487.0
100							1.4	12.1	76.8	4.4	3.7	.3	.0					98.6
105							.3	2.0	9.8	.7	.1		.1					13.0
110						.1	.3	.6	1.5	.1	.2	.1						2.8
115							.1	.3	.1	.1								.6
120																		
SUM			.4	.2	8.7	36.2	103.1	370.7	4186.4	196.9	164.8	76.8	27.8	8.2	2.8	.7	.5	5184.3

MINUTES FOR COLLECTIVE VS AIRSPEED BY WEIGHT SUM. BY ALTITUDE SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS			.4	.1	1.8	7.4	43.6	160.2	914.4	38.2	19.9	7.6	2.0	.6	.1			1196.3
40		.1	3.3	.6	1.3	4.3	32.4	97.5	412.3	52.6	53.2	46.6	18.0	4.6	1.3	1.2	.4	729.7
60			.3	.9	1.0	3.4	21.4	58.8	254.0	20.4	19.2	16.6	8.8	3.3	.9	.6	.4	409.9
65			.3		.5	6.1	17.7	65.4	310.3	22.1	24.7	17.9	6.9	2.1	.5	.0	1.5	476.1
70					.8	3.6	14.9	59.0	397.0	33.6	29.2	15.2	6.7	2.9	.6	.5	1.2	565.2
75						2.8	18.0	65.5	618.3	54.9	55.5	22.5	7.1	2.6	1.0	.3	1.5	850.0
80						9.8	16.0	80.3	1304.9	89.5	52.4	19.1	7.8	3.0	1.4	.3	1.4	1585.9
85					3.9	13.2	31.8	75.9	2106.2	104.1	55.6	22.9	8.8	3.7	1.7	.2	1.4	2429.4
90					2.1	7.7	24.1	103.8	2110.6	79.3	47.9	20.9	5.3	1.0	.7	.2	.3	2403.7
95					.5	2.6	15.2	91.7	969.3	42.0	26.1	5.9	3.8	.9	.2	.2	.1	1148.5
100						1.2	1.9	28.2	237.6	12.6	8.7	1.8	.3	.1	.1	.1	.1	292.9
105							.7	7.0	44.0	2.7	.3		.1	.4			.0	55.2
110						.2	.4	1.3	14.1	.9	.5	.2						17.5
115							.1	.3	1.2	.2								1.7
120																		
SUM		.1	4.2	1.5	11.9	62.2	238.2	884.9	9694.1	553.2	393.1	197.2	75.7	25.3	8.3	3.6	8.4	12162.1

TABLE XVI. TIME FOR LONGITUDINAL CYCLIC BOOST TUBE STEADY LOAD VERSUS LATERAL CYCLIC BOOST TUBE STEADY LOAD BY COLLECTIVE BOOST TUBE STEADY LOAD

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -450

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200																		
-150																		
-100									.1									.1
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									.1									.1

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -400

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200																		
-150																		
-100									2.1	1.3	.9							4.2
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									2.1	1.3	.9							4.2

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -350

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200																		
-150																		
-100									.3	.4	.9							1.5
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									.3	.4	.9							1.5

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -300

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200																		
-150																		
-100									1.8	1.8	4.4	4.0						11.9
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									1.8	1.8	4.4	4.0						11.9

TABLE XVI - Continued

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -250

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200									.1									.1
-150									1.0	1.2	.0							2.3
-100									6.3	10.5	34.5	8.4	.1					59.9
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									7.4	11.7	34.6	8.4	.1					62.2

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -200

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250																		
-200								.1	.5	.3	.1							.9
-150									4.3	.6	2.0	1.1						8.0
-100									36.9	63.9	92.3	34.0	2.1					229.3
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM								.1	41.6	64.8	94.6	35.2	2.1					238.2

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -150

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250										.1								.1
-200								.1	2.5	1.1	.2	.3	.1					4.3
-150								.1	23.6	6.8	10.7	10.0	1.4					52.5
-100								1.1	133.5	247.0	262.5	163.3	23.8	1.8	.0			827.9
100									.0									.0
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM								1.2	159.6	250.0	273.4	173.6	25.3	1.8	.0			884.9

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT -100

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400										.1	.5							.6
-350									.4	.3	.5		.5	2.6				4.2
-300									.4	7.4	1.9	.1	7.1					16.8
-250									6.6	12.7	3.0	1.1	5.1					28.4
-200									41.2	47.7	27.6	24.1	11.8	.2				152.6
-150								.9	164.6	379.5	394.3	225.7	57.2	2.9				1225.1
-100							.4	8.1	821.9	2409.9	3589.0	1221.6	190.3	23.9	.4			8265.4
100									.2		.7							.9
150													.1					.1
200																		
250																		
300																		
350																		
400																		
450																		
SUM							.4	9.0	1035.2	2857.5	4017.5	1472.5	272.0	29.7	.4			9694.1

TABLE XVI - Continued

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 100

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400											.1							.1
-350												.6	1.4	.3				2.3
-300										.0			.7					.7
-250									.9	.4	.3	.0						1.6
-200									10.1	7.8	6.6	5.4	.6	.0		.0		30.4
-150									27.3	70.0	56.3	18.0	1.0	.2				172.8
-100								.1	46.8	121.9	144.4	30.1	1.5	.6				345.3
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM								.1	85.1	200.2	207.7	54.1	4.9	1.2		.0		553.2

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 150

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400												.2		.1				.2
-350												.1	.2					.2
-300									.1	.4								.5
-250									.4	.4	.7	.1	.2					1.7
-200									8.6	8.2	5.3	2.2	.1	.1				24.6
-150									28.3	56.4	49.[illegible]	6.8	.9	.1				140.9
-100									29.6	88.4	94.6	11.6	.8					224.9
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									66.9	153.9	149.0	21.0	2.1	.2				393.1

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 200

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350												.1	.4					.5
-300										.1								.1
-250									.2	.4	.4	.2						1.2
-200									4.2	5.6	2.8	2.1	.5					15.2
-150									15.8	34.8	23.4	3.8	1.5					79.2
-100									17.9	44.4	32.8	5.5	.4					101.0
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									38.1	85.3	59.5	11.6	2.8					197.2

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 250

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250										.0	.4	.2						.6
-200									1.2	2.9	1.8	.8	.1	.1				6.8
-150									6.4	15.6	6.9	2.8	1.5					33.1
-100									4.6	18.0	8.0	4.3	.3					35.2
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									12.2	36.5	17.0	8.1	1.8	.1				75.7

TABLE XVI - Continued

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 300

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250											.1	.2						.3
-200									.7	1.4	.6	.7	.3					3.7
-150									1.2	4.5	3.0	1.2	.1					10.1
-100									1.3	4.2	4.4	1.4						11.3
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									3.2	10.1	8.1	3.4	.4					25.3

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 350

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250									.1		.0							.1
-200									.0	.3	.7	.2	.1					1.3
-150										2.9	.8		.1	.1				3.8
-100									.3	1.6	.9	.3						3.1
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									.4	4.7	2.5	.5	.2	.1				8.3

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 400

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250												.0						.0
-200										.2	.1	.2	.1					.5
-150										.3	.7	.1	.2					1.3
-100									.2	1.5								1.7
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									.2	2.0	.8	.3	.3					3.6

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT 450

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400																		
-350																		
-300																		
-250											.1		.0					.1
-200										.1	.5	1.0	.4					2.0
-150									.0	.4	1.7	2.1	.4					4.6
-100									.5	.4	.8							1.7
100																		
150																		
200																		
250																		
300																		
350																		
400																		
450																		
SUM									.5	.9	3.1	3.0	.8					8.4

TABLE XVI - Concluded

MINUTES FOR CYCLIC LONG VS CYCLIC LAT BY COLLECT SUM

	LESS	-450	-400	-350	-300	-250	-200	-150	-100	100	150	200	250	300	350	400	450	SUM
LESS																		
-450																		
-400										.1	.6	.2		.1				.9
-350									.4	.3	.5	.7	2.4	2.9				7.2
-300									.4	7.9	1.9	.1	7.8					18.1
-250									8.2	14.0	5.1	1.7	5.3					34.2
-200								.2	69.1	75.7	46.4	37.0	13.7	.4		.0		242.5
-150								1.0	272.6	573.0	548.2	271.4	64.2	3.3				1733.6
-100							.4	9.3	1103.8	3010.2	4270.4	1484.5	219.3	26.3	.4			10124.6
100									.2		.7							.9
150													.1					.1
200																		
250																		
300																		
350																		
400																		
450																		
SUM							.4	10.4	1454.6	3681.1	4873.6	1795.6	312.8	33.0	.4	.0		12162.1

TABLE XVII. LONGITUDINAL CYCLIC BOOST TUBE LOAD PEAKS FOR AIRSPEED VERSUS INCREMENTAL LONGITUDINAL CYCLIC BOOST TUBE LOAD BY MISSION SEGMENT

VELOCITY VS CY-LNG PEAKS BY MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200	5															5
-150	22	1														23
-100																
100	11	11	7	6	11	4	4	1	2	1	1					59
150	15	49	27	64	36	23	28	27	14	5	1					270
200	14	47	24	27	29	22	23	13	18	7	4					228
250	3	14	12	9	17	16	17	11	10	2	1					112
300	1	7		4	10	7	11	3	1	1						45
350	1	1	1	2	3	2	3	1	1	3		2	1			21
400		1							1	2						4
450		1														1
SUM	72	132	71	92	106	74	87	56	47	21	7	2	1			768
TIME	347,1	465,4	291,4	317,9	313,9	273,0	246,8	177,0	99,6	39,4	12,5	4,0	,7	,0	0,0	2587,9

VELOCITY VS CY-LNG PEAKS BY MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100																
100																
150				1												1
200						1		4	2							7
250					1		2	1	2	1						7
300								1			1					2
350											1	2				3
400												2				2
450																
SUM				1	1	1	2	6	4	1	2	4				22
TIME	0,0	3,0	3,6	6,2	10,4	12,5	18,8	27,9	24,9	12,7	6,0	5,7	2,1	,5	0,0	134,2

VELOCITY VS CY-LNG PEAKS BY MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250	1															1
-200	8															8
-150	30															30
-100																
100	40	2	2	1	2	9	8	14	13	10	3					104
150	38	18	2	10	10	21	31	40	61	37	22	1		1		292
200	6	13	3	10	4	10	21	40	38	25	12	1	1	1		185
250	6	5	1	1	4	9	13	29	24	20	4	2	2			120
300			2	1		1	3	5	4	2	6	1				25
350									1	2						3
400									1							1
450											1					1
SUM	129	38	10	23	20	50	76	128	142	96	48	5	5	2		770
TIME	310,9	241,9	94,2	105,2	138,9	224,3	338,7	428,1	385,6	228,2	73,1	19,7	5,3	,8	0,0	2594,9

TABLE XVII - Concluded

VELOCITY VS CY-LNG PEAKS BY MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150	3		1	1		1	1	1								8
-100																
100	32							1	2	2						37
150	9							1								10
200																
250																
300																
350																
400																
450																
SUM	44		1	1		1	1	3	2	2						55
TIME	538.3	19.5	20.7	47.7	102.0	340.2	981.[illegible]	1796.4	1893.7	868.2	201.1	25.8	9.5	.3	0.0	6845.0

TABLE XVIII. LATERAL CYCLIC BOOST TUBE LOAD PEAKS FOR AIRSPEED VERSUS INCREMENTAL LATERAL CYCLIC BOOST TUBE LOAD BY MISSION SEGMENT

VELOCITY VS CY-LAT PEAKS BY MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS		1														1
-450																
-400																
-350																
-300	1	1			1											3
-250	1															1
-200	4	2				1		1								8
-150	25	9	5	7	4	4	1	1								56
-100																
100	57	20	5	10	5	15	5	3	7	7		1	1			136
150	14	6	2	1	3	3	3			4		1		1		38
200	·1	1							1							3
250		1														1
300							1									1
350																
400																
450		1														1
SUM	103	42	12	18	13	23	10	5	8	11		2	1	1		249
TIME	347.1	465.4	291.4	317.0	313.9	273.0	246.8	177.0	99.6	39.6	12.5	4.0	.7	.0	0.0	2587.9

VELOCITY VS CY-LAT PEAKS BY MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200							1				1					2
-150							1									1
-100																
100							2		1		1					4
150						1										1
200																
250																
300																
350																
400																
450																
SUM						1	4		1		2					8
TIME	0.0	3.0	3.6	6.2	10.4	12.5	18.8	27.9	24.9	12.7	6.0	5.7	2.1	.5	0.0	134.2

TABLE XVIII - Concluded

VELOCITY VS CY-LAT PEAKS BY MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350	3	13			1											17
-300		2		6	1			1								10
-250	3	3		3	2		1	1	1	1						15
-200	33	11	4	3	7	5	3	1	3		1					71
-150	120	27	17	12	23	22	19	16	8	5	2	1				272
-100																
100	36	4	4	1	2	6	6	6	3	3		1				72
150	11	3		2	1	2										19
200							1									1
250																
300																
350	1															1
400																
450																
SUM	207	63	25	27	37	35	30	25	15	9	3	2				478
TIME	310,9	241,9	94,2	105,2	138,9	224,3	338,7	428,1	385,6	228,2	73,1	19,7	5,3	,8	0,0	2594,9

VELOCITY VS CY-LAT PEAKS BY MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200	1															1
-150	9															9
-100																
100	4								1							5
150	3									1						4
200																
250																
300																
350																
400																
450																
SUM	17								1	1						19
TIME	538,3	19,5	20,7	47,7	102,0	340,2	981,6	1796,4	1893,7	868,2	201,1	25,8	9,5	,3	0,0	6845,0

TABLE XIX. COLLECTIVE BOOST TUBE LOAD PEAKS FOR AIRSPEED VERSUS INCREMENTAL COLLECTIVE BOOST TUBE LOAD BY MISSION SEGMENT

VELOCITY VS COLLECTIVE PEAKS BY MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400		1														1
-350	1															1
-300	1															1
-250	6			1	1											8
-200	16	6		2	2	1	3									30
-150	79	19	7	6	3	7	1	2	1	1		1				127
-100																
100	6	3	1	4	10	8	4	10	4	3	2					55
150	4	4		1	1	1	1	6	2							20
200	2	1				2	4	2								11
250																
300	1															1
350																
400																
450																
SUM	116	34	8	14	17	19	13	20	7	4	2	1				255
TIME	347,1	465,4	291,4	317,0	313,9	273,0	246,8	177,0	99,6	39,4	12,5	4,0	,7	,0	0,0	2587,9

TABLE XIX - Concluded

VELOCITY VS COLLECTIVE PEAKS BY MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200					1								1			2
-150		1	1		1						1	6	3			13
-100																
100					1			5	5			1				12
150							2									2
200						1	1		2	1						5
250				1			1									2
300						1		1								2
350								1								1
400																
450				1		1					1					3
SUM		1	1	2	3	3	4	7	7	1	2	7	4			42
TIME	0.0	3.0	3.6	6.2	10.4	12.5	18.8	27.9	24.9	12.7	6.0	5.7	2.1	.5	0.0	134.2

VELOCITY VS COLLECTIVE PEAKS BY MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS	1															1
-450																
-400																
-350																
-300																
-250	1															1
-200	4							1	1	1	1					8
-150	37	2	1		2		1	3		1			1			48
-100																
100	6	7	8	7	7	2	9	16	10	4	5					81
150	8	39	11	11	9	11	10	12	10	6	3		1			131
200	4	61	22	23	22	24	25	24	22	9	5	1	1			243
250	1	54	34	39	25	36	29	30	19	6	2	2	1			278
300	1	34	25	20	25	24	12	17	14	7	1	1				181
350		9	14	16	14	10	5	6	7	4	1					86
400		4	6	4	5	2	5	1	2							29
450			4	2	4	7	14	10	3							44
SUM	63	210	125	122	113	116	110	120	88	38	18	4	4			1131
TIME	310.9	241.9	94.2	105.2	138.9	224.3	338.7	428.1	585.6	228.2	73.1	19.7	5.3	.8	0.0	2594.9

VELOCITY VS COLLECTIVE PEAKS BY MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150	1						3		1							5
-100																
100	5			1	1	1	7	11	5	7						38
150	2				2		3	2	3							12
200									2							2
250								1				1				2
300																
350																
400																
450																
SUM	8			1	3	1	13	14	11	7		1				59
TIME	538.3	19.5	20.7	47.7	102.0	340.2	981.0	1796.4	1893.7	868.2	201.1	25.8	9.5	.3	0.0	6845.0

TABLE XX. GUST n_z PEAKS FOR μ VERSUS n_z BY MISSION SEGMENT, ALTITUDE, AND C_T/σ

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2			1					1
0.8								
SUM			1					1
TIME	0.0	56.4	46.3	17.4	1.1	0.0	0.0	121.2

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1	1	2				4
0.8								
0.7		1						1
0.6								
SUM		2	1	2				5
TIME	0.0	165.4	175.6	105.5	7.1	0.0	0.0	453.6

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1	2	2				5
0.8								
0.7		1						1
0.6								
SUM		2	2	2				6
TIME	0.0	221.8	221.9	122.9	8.2	0.0	0.0	574.8

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				1				1
0.8								
0.7			1	1				2
0.6								
SUM			1	2				3
TIME	0.0	172.2	701.5	730.1	36.0	0.0	0.0	1639.7

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				1				1
0.8								
0.7			1	1				2
0.6								
SUM			1	2				3
TIME	0.0	206.0	826.7	843.9	39.0	0.0	0.0	1915.5

TABLE XX - Continued

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1	2	3				6
0.8								
0.7		1	1	1				3
0.6								
SUM		2	3	4				9
TIME	0.0	448.8	1087.2	1003.3	48.6	0.0	0.0	2587.9

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				3	1			4
0.8								
0.7				1	1			2
0.6				1				1
0.5								
SUM				5	2			7
TIME	0.0	0.0	9.1	66.6	5.2	.1	0.0	81.0

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				3	1			4
0.8								
0.7				1	1			2
0.6				1				1
0.5								
SUM				5	2			7
TIME	0.[illegible]	.9	15.2	89.4	8.4	.1	0.0	114.1

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				3	1			4
0.8								
0.7				1	1			2
0.6				1				1
0.5								
SUM				5	2			7
TIME	0.0	1.3	15.6	92.7	24.5	.1	0.0	134.2

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2			1	2				3
0.8								
0.7					1			1
0.6								
SUM			1	2	1			4
TIME	0.0	76.2	51.8	49.0	1.6	0.0	0.0	178.7

TABLE XX - Continued

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2			1	2	1			4
0.8								
0.7					1			1
0.6								
SUM			1	2	2			5
TIME	0.0	171.4	131.0	153.6	12.8	0.0	0.0	468.7

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2			2	4	1			7
0.8								
0.7					2			2
0.6								
SUM			2	4	3			9
TIME	0.0	247.6	182.8	202.6	14.4	0.0	0.0	647.5

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				1				1
0.8								
0.7				1				1
0.6								
SUM				2				2
TIME	0.0	37.4	66.4	318.6	38.3	0.0	0.0	460.7

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				2				2
0.8								
SUM				2				2
TIME	0.0	86.1	162.7	944.1	201.3	0.0	0.0	1394.3

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				3				3
0.8								
0.7				1				1
0.6								
SUM				4				4
TIME	0.0	123.5	229.0	1262.7	239.7	0.0	0.0	1855.0

TABLE XX - Continued

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2			2	7	1			10
0.8								
0.7				1	2			3
0.6								
SUM			2	8	3			13
TIME	0.0	391.7	419.8	1520.0	263.4	0.0	0.0	2594.9

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				1				1
0.8								
0.7								
0.6				1				1
0.5								
SUM				2				2
TIME	0.0	44.8	11.0	600.7	47.7	0.0	0.0	704.2

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				1				1
0.8								
0.7				3				3
0.6								
SUM				4				4
TIME	0.0	160.0	105.2	4275.0	803.0	0.0	0.0	5343.2

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				2				2
0.8								
0.7				3				3
0.6				1				1
0.5								
SUM				6				6
TIME	0.0	204.8	116.2	4875.7	850.7	0.0	0.0	6047.4

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 5000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.7								
0.6				1				1
0.5								
SUM				1				1
TIME	0.0	0.0	3.7	299.1	30.0	0.0	0.0	332.8

TABLE XX - Concluded

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 5000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.7								
0.6				1				1
0.5								
SUM				1				1
TIME	0.0	0.0	3.7	319.5	30.0	0.0	0.0	353.2

GUST NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2				2				2
0.8								
0.7				3				3
0.6				2				2
0.5								
SUM				7				7
TIME	0.0	541.2	121.8	5280.6	901.4	0.0	0.0	6845.0

GUST NZ PEAKS FOR MU VS NZ

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1	4	15	2			22
0.8								
0.7		1	1	6	3			11
0.6				3				3
0.5								
SUM		2	5	24	5			36
TIME	0.0	1383.0	1644.4	7896.7	1237.9	.1	0.0	12162.1

TABLE XXI. GUST n_z PEAKS FOR AIRSPEED VERSUS n_z BY WEIGHT, ALTITUDE, AND MISSION SEGMENT

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		1														1
0.8																
SUM		1														1
TIME	17.2	9.7	3.1	3.5	3.2	1.6	1.1	1.2	.6	0.0	0.0	0.0	0.0	0.0	0.0	41.1

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		1														1
0.8																
SUM		1														1
TIME	65.6	25.0	7.4	8.4	9.1	7.6	8.6	5.3	4.4	.8	.2	.4	0.0	0.0	0.0	142.6

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		1														1
0.8																
SUM		1														1
TIME	121.7	67.3	30.7	38.4	48.0	93.4	168.9	263.8	243.8	106.1	26.0	6.4	1.1	0.0	0.0	1215.7

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2					1		1									2
0.8																
SUM					1		1									2
TIME	90.3	61.1	21.9	26.0	21.0	17.5	11.1	7.0	3.0	2.6	1.0	2.0	.5	.0	0.0	265.0

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		2				2	2			1						7
0.8																
0.7										2						2
0.6																
SUM		2				2	2			3						9
TIME	98.0	71.7	20.4	18.9	21.3	24.9	23.1	20.7	15.4	6.1	1.8	.5	.6	.0	0.0	323.4

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		2			1	2	3			1						9
0.8																
0.7										2						2
0.6																
SUM		2			1	2	3			3						11
TIME	359.0	133.1	42.4	44.9	42.9	44.8	40.6	44.5	26.9	15.6	6.3	5.9	2.1	.1	0.0	809.3

TABLE XXI - Continued

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2							1									1
0.8																
0.7						1										1
0.6																
SUM						1	1									2
TIME	63.5	135.3	100.1	106.4	111.5	103.1	89.8	82.0	45.9	20.2	7.5	1.8	.2	0.0	0.0	867.2

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2							1	2		1						4
0.8																
0.7									1	1						2
0.6							1									1
0.5																
SUM							2	2	1	2						7
TIME	0.0	.7	.6	2.7	2.9	4.4	6.6	10.2	9.3	2.7	.4	.2	0.0	0.0	0.0	40.6

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2						1	1									2
0.8																
0.7										1						1
0.6																
SUM						1	1			1						3
TIME	46.7	45.1	25.4	32.4	51.1	74.7	131.3	172.7	154.5	88.5	37.0	11.6	2.3	.7	0.0	874.0

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2							1		1							2
0.8																
0.7																
0.6									1							1
0.5																
SUM							1		2							3
TIME	85.2	11.3	11.9	25.0	50.3	155.9	441.9	723.8	915.7	408.2	108.1	16.2	9.1	.3	0.0	2962.9

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2						1	4	2	1	1						9
0.8																
0.7						1			1	2						4
0.6							1		1							2
0.5																
SUM						2	5	2	3	3						15
TIME	195.4	192.3	138.1	166.4	215.8	338.1	669.7	988.7	1125.3	519.6	153.0	29.8	11.6	1.0	0.0	4744.7

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		2			1	3	7	2	1	2						18
0.8																
0.7						1			1	4						6
0.6							1		1							2
0.5																
SUM		2			1	4	8	2	3	6						26
TIME	584.1	336.3	182.9	219.0	265.8	396.4	744.7	1074.5	1184.1	555.4	168.3	35.8	13.6	1.1	0.0	5762.1

TABLE XXI - Continued

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 1000, MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		2														2
0.8																
0.7		1														1
0.6																
SUM		3														3
TIME	77,3	59,9	29,3	28,6	25,7	15,8	13,9	9,8	5,6	1,9	,7	,1	,1	0,0	0,0	268,6

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		2														2
0.8																
0.7		1														1
0.6																
SUM		3														3
TIME	259,7	111,2	47,3	45,1	40,3	35,5	38,1	40,2	32,3	13,2	5,2	2,9	1,3	,5	0,0	672,9

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 2000, MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.8																
0.7			1													1
0.6																
SUM			1													1
TIME	66,3	155,5	115,4	118,3	125,0	104,5	101,7	56,6	36,0	9,9	1,6	,1	0,0	0,0	0,0	891,0

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 2000, MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2									1							1
0.8																
SUM									1							1
TIME	35,3	42,8	18,8	23,1	33,7	69,5	102,5	138,8	137,4	90,0	22,1	3,1	1,0	,1	0,0	718,2

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 2000, MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.8																
0.7					1		1	1								3
0.6																
SUM					1		1	1								3
TIME	91,4	6,4	7,1	18,9	44,0	136,0	396,8	770,8	712,5	353,0	67,9	6,9	,4	0,0	0,0	2612,1

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000, ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2									1							1
0.8																
0.7			1		1		1	1								4
0.6																
SUM			1		1		1	1	1							5
TIME	193,0	205,1	143,6	162,7	206,8	313,3	609,0	977,4	897,9	456,3	91,8	10,1	1,4	,1	0,0	4268,4

TABLE XXI - Concluded

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 5000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.7																
0.6						1										1
0.5																
SUM						1										1
TIME	0.0	0.0	0.0	1.5	1.4	4.5	17.7	56.6	31.8	12.2	.5	0.0	0.0	0.0	0.0	126.2

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.7																
0.6						1										1
0.5																
SUM						1										1
TIME	.2	4.5	3.5	10.4	4.0	11.1	24.3	65.0	43.2	17.3	1.5	.1	.2	0.0	0.0	185.3

GUST NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8COO

	LESS	40	60	65	70	75	80	95	90	95	100	105	110	115	120	SUM
1.3																
1.2		2							1							3
0.8																
0.7		1	1		1		1	1								5
0.6						1										1
0.5																
SUM		3	1		1	1	1	1	1							9
TIME	490.4	326.1	196.3	218.8	251.4	360.2	672.3	1091.0	975.8	487.0	98.6	13.0	2.8	.6	0.0	5184.3

GUST NZ PEAKS FOR VELOCITY VS NZ

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		5			1	3	7	2	2	2						22
0.8																
0.7		1	1		1	1	1	1	1	4						11
0.6						1	1		1							3
0.5																
SUM		6	1		2	5	9	3	4	6						36
TIME	1196.3	729.7	409.9	476.1	565.2	850.0	1585.9	2429.4	2403.7	1148.5	292.9	55.2	17.5	1.7	0.0	12162.1

TABLE XXII. MANEUVER n_z PEAKS FOR μ VERSUS n_z BY MISSION SEGMENT, ALTITUDE, AND C_T/σ

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE LESS, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1			1			2
0.8								
SUM		1			1			2
TIME	0.0	1.5	.4	.1	.1	0.0	0.0	2.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE LESS, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.5								
1.4				1				1
1.3			2					2
1.2		5	3	1				9
0.8								
0.7				2				2
0.6								
SUM		5	5	4				14
TIME	0.0	17.0	5.5	.9	.5	0.0	0.0	23.9

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.5								
1.4				1				1
1.3			2					2
1.2		6	3	1	1			11
0.8								
0.7				2				2
0.6								
SUM		6	5	4	1			16
TIME	0.0	18.4	6.0	1.0	.6	0.0	0.0	26.0

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.5								
1.4			1	1	1			3
1.3		1	6	4				11
1.2		11	11	9				31
0.8								
0.7			2	2				4
0.6		1	1					2
0.5								
SUM		13	21	16	1			51
TIME	0.0	56.4	46.3	17.4	1.1	0.0	0.0	121.2

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	1				2
1.5		1			2			3
1.4			4	2	2			8
1.3		1	9	7				17
1.2		13	37	29	6			85
0.8								
0.7		3	5	6	1			15
0.6				2				2
0.5								
SUM		18	56	47	11			132
TIME	0.0	165.4	175.6	105.5	7.1	0.0	0.0	453.6

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	1				2
1.5		1			2			3
1.4			5	3	3			11
1.3		2	15	11				28
1.2		24	48	38	6			116
0.8								
0.7		3	7	8	1			19
0.6		1	1	2				4
0.5								
SUM		31	77	63	12			183
TIME	0.0	221.8	221.9	122.9	8.2	0.0	0.0	574.8

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.5								
1.4			1					1
1.3			4	2				6
1.2		3	12	22	1			38
0.8								
0.7			11	9	1			21
0.6				1				1
0.5								
SUM		3	28	34	2			67
TIME	0.0	33.8	125.2	113.8	3.0	0.0	0.0	275.8

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5								
1.4			1	7				8
1.3			13	8				21
1.2		12	57	54	2			125
0.8								
0.7		7	45	48				100
0.6		1	1	2				4
0.5				1				1
0.4								
SUM		20	117	121	2			260
TIME	0.0	172.2	701.5	730.1	36.0	0.0	0.0	1639.7

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5								
1.4			2	7				9
1.3			17	10				27
1.2		15	69	76	3			163
0.8								
0.7		7	56	57	1			121
0.6		1	1	3				5
0.5				1				1
0.4								
SUM		23	145	155	4			327
TIME	0.0	206.0	826.7	843.9	39.0	0.0	0.0	1915.5

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 5000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.8								
0.7		1						1
0.6								
SUM		1						1
TIME	0.0	1.6	29.5	32.8	1.0	0.0	0.0	64.9

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT, ALTITUDE 5000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.8								
0.7		1						1
0.6								
SUM		1						1
TIME	0.0	2.4	30.9	35.4	1.0	0.0	0.0	69.7

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT ASCENT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	2				3
1.5		1			2			3
1.4			7	11	3			21
1.3		2	34	21				57
1.2		45	120	115	10			290
0.8								
0.7		11	63	67	2			143
0.6		2	2	5				9
0.5				1				1
0.4								
SUM		61	227	222	17			527
TIME	0.0	448.8	1087.2	1003.3	48.6	0.0	0.0	2587.9

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3					2			2
1.2			1	1	6			8
0.8								
0.7				1	2			3
0.6					1			1
0.5								
SUM			1	2	11			14
TIME	0.0	.4	.4	3.3	16.0	0.0	0.0	20.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3					2			2
1.2			1	1	6			8
0.8								
0.7				1	2			3
0.6					1			1
0.5								
SUM			1	2	11			14
TIME	0.0	.4	.4	3.3	16.0	0.0	0.0	20.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5				1				1
1.4				2				2
1.3			3	6				9
1.2			3	16	2			21
0.8								
0.7			2	5				7
0.6								
0.5								
0.4								
0.2								
LESS				1				1
SUM			8	32	2			42
TIME	0.0	.9	6.1	22.9	3.2	0.0	0.0	33.0

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.6								
1.5				1	1			2
1.4				1	1			2
1.3				4	1			5
1.2				20	7			27
0.8								
0.7			5	8	2			15
0.6				2				2
0.5								
SUM			5	36	12			53
TIME	0.0	0.0	9.1	66.6	5.2	.1	0.0	81.0

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000, CT/S 0.09

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.5								
0.4						1		1
0.2								
SUM						1		1
TIME	0.0	0.0	0.0	0.0	0.0	.1	0.0	.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5				2	1			3
1.4				3	1			4
1.3			3	10	1			14
1.2			3	36	9			48
0.8								
0.7			7	13	2			22
0.6				2				2
0.5								
0.4						1		1
0.2								
LESS				1				1
SUM			13	68	14	1		96
TIME	0.0	.9	15.2	89.4	8.4	.1	0.0	114.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT MANUVR

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5				2	1			3
1.4				3	1			4
1.3			3	10	3			16
1.2			4	37	15			56
0.8								
0.7			7	14	4			25
0.6				2	1			3
0.5								
0.4						1		1
0.2								
LESS				1				1
SUM			14	70	25	1		110
TIME	0.0	1.3	15.6	92.7	24.5	.1	0.0	134.2

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE LESS, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3			1					1
1.2								
SUM			1					1
TIME	0.0	4.2	1.9	.3	0.0	0.0	0.0	6.4

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE LESS, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1	1	1				3
0.8								
SUM		1	1	1				3
TIME	0.0	16.4	2.4	.3	.0	0.0	0.0	19.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3			1					1
1.2		1	1	1				3
0.8								
SUM		1	2	1				4
TIME	0.0	20.6	4.4	.6	.0	0.0	0.0	25.6

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				2				2
1.5				2				2
1.4		1	2	8	1			12
1.3		1	4	6	1			12
1.2		2	15	12				29
0.8								
0.7		1	2	4				7
0.6			1					1
0.5								
SUM		5	24	34	2			65
TIME	0.0	76.2	51.8	49.0	1.6	0.0	0.0	178.7

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	5				6
1.5			1	7	1			9
1.4			4	16				20
1.3		6	22	23	4			55
1.2		1	54	64	11			130
0.8								
0.7		2	7	4	3			16
0.6			1	2				3
0.5								
0.4				1				1
0.2								
SUM		9	90	122	19			240
TIME	0.0	171.4	131.0	153.6	12.8	0.0	0.0	468.7

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000, CT/S 0.09

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.8								
0.7		1						1
0.6								
SUM		1						1
TIME	0.0	.1	0.0	0.0	0.0	0.0	0.0	.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	7				8
1.5			1	9	1			11
1.4		1	6	24	1			32
1.3		7	26	29	5			67
1.2		3	69	76	11			159
0.8								
0.7		4	9	8	3			24
0.6			2	2				4
0.5								
0.4				1				1
0.2								
SUM		15	114	156	21			306
TIME	0.0	247.6	182.8	202.6	14.4	0.0	0.0	647.5

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	1				2
1.5				2				2
1.4		3	1	7	1			12
1.3		2	8	22	2			34
1.2		2	17	82	5			106
0.8								
0.7			4	21	5			30
0.6			1	2	1			4
0.5			1	5				6
0.4				5				5
0.2				4				4
LESS								
SUM		7	33	151	14			205
TIME	0.0	37.4	66.4	318.6	38.3	0.0	0.0	460.7

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			1	3	1			5
1.5			1	4	2			7
1.4			4	20	4			28
1.3			9	40	13			62
1.2		3	39	125	35			202
0.8								
0.7		4	11	68	17			100
0.6			3	5	2			10
0.5				1	1			2
0.4								
SUM		7	68	266	75			416
TIME	0.0	86.1	162.7	944.1	201.3	0.0	0.0	1394.3

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			2	4	1			7
1.5			1	6	2			9
1.4		3	5	27	5			40
1.3		2	17	62	15			96
1.2		5	56	207	40			308
0.8								
0.7		4	15	89	22			130
0.6			4	7	3			14
0.5			1	6	1			8
0.4				5				5
0.2				4				4
LESS								
SUM		14	101	417	89			621
TIME	0.0	123.5	229.0	1262.7	239.7	0.0	0.0	1855.0

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 5000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3			1	1				2
1.2				1				1
0.8								
0.7			1					1
0.6					1			1
0.5								
SUM			2	2	1			5
TIME	0.0	0.0	2.1	50.6	7.4	0.0	0.0	60.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT, ALTITUDE 5000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3			1	1				2
1.2				1				1
0.8								
0.7			1					1
0.6					1			1
0.5								
SUM			2	2	1			5
TIME	0.0	0.0	2.1	52.6	9.2	0.0	0.0	63.9

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			3	11	1			15
1.5			2	15	3			20
1.4		4	11	51	6			72
1.3		9	45	92	20			166
1.2		9	126	285	51			471
0.8								
0.7		8	25	97	25			155
0.6			6	9	4			19
0.5			1	6	1			8
0.4				6				6
0.2				4				4
LESS								
SUM		30	219	576	111			936
TIME	0.0	391.7	419.8	1520.0	263.4	0.0	0.0	2594.9

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE LESS, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2					1			1
0.8								
SUM					1			1
TIME	0.0	28.0	0.0	1.1	6.3	0.0	0.0	35.5

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2					1			1
0.8								
SUM					1			1
TIME	0.0	33.0	0.0	1.1	8.0	0.0	0.0	42.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 1000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1		1	1			3
0.8								
0.7				1				1
0.6								
SUM		1		2	1			4
TIME	0.0	212.8	.7	58.2	9.6	0.0	0.0	281.3

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 1000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
0.8								
0.7		1						1
0.6								
SUM		1						1
TIME	0.0	90.7	1.1	8.6	.7	0.0	0.0	101.1

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 1000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.3								
1.2		1		1	1			3
0.8								
0.7		1		1				2
0.6								
SUM		2		2	1			5
TIME	0.0	303.5	1.8	66.8	10.3	0.0	0.0	382.5

TABLE XXII - Continued

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000, CT/S LESS

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.5								
1.4			1					1
1.3				2				2
1.2				27	5			32
0.8								
0.7				7	2			9
0.6				1				1
0.5								
SUM			1	37	7			45
TIME	0.0	44.8	11.0	600.7	47.7	0.0	0.0	704.2

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5			1					1
1.4				3	1			4
1.3			1	11	3			15
1.2			9	82	41			132
0.8								
0.7			1	81	19			101
0.6				3	2			5
0.5								
SUM			12	181	66			259
TIME	0.0	160.0	105.2	4275.0	803.0	0.0	0.0	5343.2

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 2000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5			1					1
1.4			1	3	1			5
1.3			1	13	3			17
1.2			9	109	46			164
0.8								
0.7			1	88	21			110
0.6				4	2			6
0.5								
SUM			13	218	73			304
TIME	0.0	204.8	116.2	4875.7	850.7	0.0	0.0	6047.4

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 5000, CT/S 0.06

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3				2				2
1.2								
0.8								
0.7			1	6	1			8
0.6								
0.5			1					1
0.4								
SUM			2	8	1			11
TIME	0.0	0.0	3.7	299.1	30.0	0.0	0.0	332.8

TABLE XXII - Concluded

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY, ALTITUDE 5000

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.4								
1.3				2				2
1.2								
0.8								
0.7			1	6	1			8
0.6								
0.5			1					1
0.4								
SUM			2	8	1			11
TIME	0.0	0.0	3.7	319.5	30.0	0.0	0.0	353.2

MANEUVER NZ PEAKS FOR MU VS NZ BY MISSION SEGMENT STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6				1				1
1.5			1					1
1.4			1	3	1			5
1.3			1	15	3			19
1.2		1	9	110	48			168
0.8								
0.7		1	2	95	22			120
0.6				4	2			6
0.5			1					1
0.4								
SUM		2	15	228	76			321
TIME	0.0	541.2	121.8	5280.6	901.4	0.0	0.0	6845.0

MANEUVER NZ PEAKS FOR MU VS NZ

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	SUM
1.7								
1.6			4	15	1			20
1.5		1	3	17	6			27
1.4		4	19	68	11			102
1.3		11	83	138	26			258
1.2		55	259	547	124			985
0.8								
0.7		20	97	273	53			443
0.6		2	8	20	7			37
0.5			2	7	1			10
0.4				6		1		7
0.2				4				4
LESS				1				1
SUM		93	475	1096	229	1		1894
TIME	0.0	1383.0	1644.4	7896.7	1237.9	.1	0.0	12162.1

TABLE XXIII. MANEUVER n_z PEAKS FOR AIRSPEED VERSUS n_z BY WEIGHT, ALTITUDE, AND MISSION SEGMENT

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3	1	2														3
1.2	4	6		1	2	2		1	1							17
0.8																
0.7																
0.6		1														1
0.5																
SUM	5	9		1	2	2		1	1							21
TIME	17.2	9.7	3.1	3.5	3.2	1.6	1.1	1.2	.6	0.0	0.0	0.0	0.0	0.0	0.0	41.1

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6									1							1
1.5								1								1
1.4		1				1										2
1.3		1		1		1	1					1				5
1.2	1	2	1		3	1	2									10
0.8																
0.7		2														2
0.6																
SUM	1	6	1	1	3	3	3	1	1			1				21
TIME	24.7	15.0	4.2	4.8	5.6	6.0	7.0	3.2	2.1	.6	.1	.2	0.0	0.0	0.0	73.5

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.8																
0.7	1															1
0.6																
SUM	1															1
TIME	23.7	.3	.1	.0	.3	.0	.5	.9	1.6	.2	.1	.1	0.0	0.0	0.0	28.0

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6									1							1
1.5								1								1
1.4		1				1										2
1.3	1	3		1		1	1					1				8
1.2	5	8	1	1	5	3	2	1	1							27
0.8																
0.7	1	2														3
0.6		1														1
0.5																
SUM	7	15	1	2	5	5	3	2	2			1				43
TIME	65.6	25.0	7.4	8.4	9.1	7.6	8.6	5.3	4.4	.8	.2	.4	0.0	0.0	0.0	142.6

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 2000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.5																
1.4					1											1
1.3			2						1							3
1.2	1	4		1	2	6	1	4	4							23
0.8																
0.7		3	1	2	3	4	1	1			1					16
0.6						1										1
0.5																
SUM	1	7	3	3	6	11	2	5	5		1					44
TIME	16.0	23.9	14.7	19.3	19.9	19.8	19.9	12.7	7.1	3.0	1.1	0.0	0.0	0.0	0.0	197.4

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 2000. MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6									1							1
1.5						1										1
1.4					1											1
1.3			1	1		2	4									8
1.2					4	3	2	4	2	1	1	1				18
0.8																
0.7		1			3			1	1							6
0.6							1									1
0.5																
0.4									1							1
0.2																
LESS						1										1
SUM		1	1	1	8	7	7	5	5	1	1	1				38
TIME	0.0	1.3	.5	1.1	3.2	4.5	3.6	5.0	2.9	2.5	1.4	.2	0.0	0.0	0.0	26.3

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 2000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6				1												1
1.5																
1.4	1	2			1	1										5
1.3		5			1	3	4			1	1					15
1.2		5	1	4	3	5	17	10	8	4	1	1				59
0.8																
0.7		1		1	1	2	1	3	4	3	1	1				18
0.6								2		1						3
0.5				1		2	3									6
0.4						3	2									5
0.2							2	2								4
LESS																
SUM	1	13	1	7	6	16	29	17	12	9	3	2				116
TIME	13.5	11.1	6.3	7.4	10.2	27.0	48.3	57.4	41.0	25.9	10.1	3.4	1.1	0.0	0.0	262.7

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 2000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3								1	1							2
1.2							5	5	3	3	1	1				18
0.8																
0.7								5	2	1						8
0.6									1							1
0.5																
SUM							5	11	7	4	1	1				29
TIME	25.9	.5	.9	1.5	4.6	30.5	73.3	110.4	147.8	62.8	11.9	2.4	0.0	0.0	0.0	472.5

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6				1					1							2
1.5						1										1
1.4	1	2			3	1										7
1.3		5	3	1	1	5	8	1	2	1	1					28
1.2	1	9	1	5	9	14	25	23	17	8	3	3				118
0.8																
0.7		5	1	3	7	6	2	10	7	4	2	1				48
0.6						1	1	2	1	1						6
0.5				1		2	3									6
0.4						3	2		1							6
0.2							2	2								4
LESS						1										1
SUM	2	21	5	11	20	34	43	38	29	14	6	4				227
TIME	55.4	36.8	22.4	29.4	38.0	81.7	145.0	185.5	198.8	94.2	24.5	6.0	1.1	0.0	0.0	918.8

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 5000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3			1					1								2
1.2																
SUM			1					1								2
TIME	0.0	0.0	.0	.1	.0	.2	1.6	4.1	8.2	4.5	0.0	0.0	0.0	0.0	0.0	18.7

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000. ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3			1					1								2
1.2																
SUM			1					1								2
TIME	0.0	4.9	.9	.5	.9	4.1	15.3	73.1	40.6	11.1	1.3	0.0	0.0	0.0	0.0	152.8

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 6000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6				1					2							3
1.5						1		1								2
1.4	1	3			3	2										9
1.3	1	8	4	2	1	6	9	2	2	1	1	1				38
1.2	6	17	2	6	14	17	27	24	19	8	3	3				145
0.8																
0.7	1	7	1	3	7	6	2	10	7	4	2	1				51
0.6		1				1	1	2	1	1						7
0.5				1		2	3									6
0.4						3	2		1							6
0.2							2	2								4
LESS						1										1
SUM	9	36	7	13	25	39	46	41	31	14	6	5				272
TIME	121.7	67.3	30.7	38.4	48.0	93.4	168.9	263.8	243.8	106.1	26.0	6.4	1.1	0.0	0.0	1215.7

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE LESS. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2	2	1				1					1					5
0.8																
0.7						1		1								2
0.6																
SUM	2	1				2		1			1					7
TIME	5.6	1.9	.3	.1	.0	.1	.1	.2	.3	.3	.2	0.0	0.0	0.0	0.0	9.1

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE LESS. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3				1												1
1.2	1					1										2
0.8																
SUM	1			1		1										3
TIME	8.3	2.9	.5	.0	.1	.3	0.0	.2	.0	0.0	.0	0.0	0.0	0.0	0.0	12.2

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE LESS. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2										1						1
0.8																
SUM										1						1
TIME	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.3	4.8	4.1	0.0	0.0	0.0	0.0	24.9

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE LESS

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3				1												1
1.2	3	1				2				1	1					8
0.8																
0.7						1		1								2
0.6																
SUM	3	1		1		3		1		1	1					11
TIME	29.6	4.7	.7	.2	.1	.3	.1	.3	.6	5.2	4.3	0.0	0.0	0.0	0.0	46.2

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6		1														1
1.5		1														1
1.4		1		2			1			1						5
1.3		4	1		4	2	3	2								16
1.2	8	16	5	7	4	6	1	2	2	3		1		1		56
0.8																
0.7	1	1	2		1	2	1			1						9
0.6	1						2									3
0.5																
SUM	10	24	8	9	9	10	8	4	2	5		1		1		91
TIME	90.3	61.1	21.9	26.0	21.0	17.5	11.1	7.0	3.0	2.6	1.0	2.0	.5	.0	0.0	265.0

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000. MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3												1				1
1.2										1			1			2
0.8																
0.7																
0.6											1					1
0.5																
SUM										1	1	1	1			4
TIME	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.5	3.3	1.0	0.0	0.0	11.8

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000. ALTITUDE 1000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6				1				1	1							3
1.5			1			1	1	1	1							5
1.4	1	1	1	1	2	5	3	4			1					19
1.3	1	10	4	3	2	2	1	3	2	1			1	1		31
1.2		14	3	10	9	11	8	6	4	1	2					68
0.8																
0.7	1	1	2		1	2			1							8
0.6			2													2
0.5																
0.4									1							1
0.2																
SUM	3	26	13	15	14	21	13	15	10	2	3		1	1		137
TIME	98.0	71.7	20.4	18.9	21.3	24.9	23.1	20.7	15.4	6.1	1.8	.5	.6	.0	0.0	323.4

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 1000, MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2										1						1
0.8																
SUM										1						1
TIME	170.7	.3	.2	0.0	.6	2.4	6.4	16.8	8.5	2.8	.1	.1	0.0	0.0	0.0	209.0

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6		1		1				1	1							4
1.5		1	1			1	1	1	1							6
1.4	1	2	1	3	2	5	4	4		1	1					24
1.3	1	14	5	3	6	4	4	5	2	1		1	1	1		48
1.2	8	30	8	17	13	17	9	8	6	6	2	1	1	1		127
0.8																
0.7	2	2	4		2	4	1		1	1						17
0.6	1		2				2				1					6
0.5																
0.4									1							1
0.2																
SUM	13	50	21	24	23	31	21	19	12	9	4	2	2	2		233
TIME	359.0	133.1	42.4	44.9	42.9	44.8	40.6	44.5	26.9	15.6	6.3	5.9	2.1	.1	0.0	809.3

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6									1							1
1.5																
1.4		1				2	2									5
1.3		3	3	2	3		1	1		1						14
1.2	3	12	9	9	10	6	5	7	3	4						68
0.8																
0.7	2	8	5	9	6	7	6	5	3	1						52
0.6																
SUM	5	24	17	20	19	15	14	13	7	6						140
TIME	63.5	135.3	100.1	106.4	111.5	103.1	89.8	82.0	45.9	20.2	7.5	1.8	.2	0.0	0.0	867.2

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.6																
1.5												1				1
1.4							1									1
1.3				1			1	1			1					4
1.2			1	1		1	3	3	3	2	1	1				16
0.8																
0.7		2					1	2	1		2					8
0.6																
SUM		2	1	[illegible]		1	6	6	4	2	4	2				30
TIME	0.0	.7	.6	2.7	2.9	4.4	6.6	10.2	9.3	2.7	.4	.2	0.0	0.0	0.0	40.6

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6					1				1		1					3
1.5									3				1			4
1.4				1	2	3	5	4	2	2	1					20
1.3		1	1	4	2	4	9	9	8	4	3	1				46
1.2		4	5	14	21	23	20	21	18	12	5	5	1			149
0.8																
0.7		5		1	5	10	3	8	12	4	2					50
0.6		1		1					1	1						4
0.5									1		1					2
0.4																
SUM		11	6	21	31	40	37	42	46	23	13	6	2			278
TIME	46.7	45.1	25.4	32.4	51.1	74.7	131.3	172.7	154.5	88.5	37.0	11.6	2.3	.7	0.0	874.0

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000, MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6							1									1
1.5					1											1
1.4					1			2		1						4
1.3				1		1			1	3						6
1.2			1	3	3	6	15	16	12	18	9	2				85
0.8																
0.7				1		6	4	13	11	12	4					51
0.6									1	1						2
0.5																
SUM			1	5	5	13	20	31	25	35	13	2				150
TIME	85.2	11.3	11.9	25.0	50.3	155.8	441.9	723.8	915.7	408.2	108.1	16.2	9.1	.3	0.0	2962.9

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6					1		1		2		1					5
1.5					1				3			1	1			6
1.4		1		1	3	5	8	6	2	3	1					30
1.3		4	4	8	5	5	11	11	9	8	4	1				70
1.2	3	16	16	27	34	36	43	47	36	36	15	8	1			318
0.8																
0.7	2	15	5	11	11	23	14	28	27	17	8					161
0.6		1		1					2	2						6
0.5									1		1					2
0.4																
SUM	5	37	25	48	55	69	77	92	82	66	30	10	2			598
TIME	195.4	192.3	138.1	166.4	215.8	338.1	669.7	988.7	1125.3	519.6	153.0	29.8	11.6	1.0	0.0	4744.7

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 5000, MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.8																
0.7		1														1
0.6																
SUM		1														1
TIME	.1	3.5	1.1	5.3	4.2	3.2	3.8	5.6	.6	.2	0.0	0.0	0.0	0.0	0.0	27.5

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000, ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
0.8																
0.7		1														1
0.6																
SUM		1														1
TIME	.1	3.9	1.6	6.5	6.5	12.9	29.9	38.7	30.1	13.9	4.6	.0	0.0	0.0	0.0	148.7

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 7000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6		1		1	1		1	1	3		1					9
1.5		1	1		1	1	1	1	4			1	1			12
1.4	1	3	1	4	5	10	12	10	2	4	2					54
1.3	1	18	9	12	11	9	15	16	11	9	4	2	1	1		119
1.2	14	47	24	44	47	55	52	55	42	43	18	9	2	1		453
0.8																
0.7	4	18	9	11	13	28	15	29	28	18	8					181
0.6	1	1	2	1			2		2	2	1					12
0.5									1		1					2
0.4									1							1
0.2																
SUM	21	89	46	73	78	103	98	112	94	76	35	12	4	2		843
TIME	584.1	336.3	182.9	219.0	265.8	396.4	744.7	1074.5	1184.1	555.4	168.3	35.8	13.6	1.1	0.0	5762.1

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE LESS. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.5																
1.4								1								1
1.3		1	1													2
1.2	3		3													6
0.8																
SUM	3	1	4					1								9
TIME	10.7	3.3	1.5	.5	.1	.2	.1	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.6

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE LESS. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		1														1
0.8																
SUM		1														1
TIME	9.7	2.0	.3	.1	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE LESS

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.5																
1.4								1								1
1.3		1	1													2
1.2	3	1	3													7
0.8																
SUM	3	2	4					1								10
TIME	37.5	5.3	1.8	.6	.2	.2	.1	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.9

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 1000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6					1											1
1.5										1		1				2
1.4			1	1		1			1	1			1			6
1.3	1	2	1	3	1				1							9
1.2	4	8	4	5	8	3	5	2	3	1						43
0.8																
0.7	1	2	1	1		1	1	1	1	1						10
0.6																
SUM	6	12	7	10	10	5	6	3	6	4		1	1			71
TIME	77.3	59.9	29.3	28.6	25.7	15.8	13.9	9.8	5.6	1.9	.7	.1	.1	0.0	0.0	268.6

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 1000. MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3														1		1
1.2			1						1		1	1	1	1		6
0.8																
0.7								1					2			3
0.6																
SUM			1					1	1		1	1	3	2		10
TIME	0.0	.5	.2	.1	.1	.1	.7	1.6	.7	.1	.5	2.1	1.1	.5	0.0	8.3

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 1000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6						1	2	1								4
1.5					1	1		1	1	1						5
1.4			1	1	1	3	2	1		2						11
1.3	1	6	2	1	7	5	3	3	1	2						31
1.2		9	12	10	8	7	12	5	7	8	2	1				81
0.8																
0.7	2	1	3		1	1	2			2	2					14
0.6								1		1						2
0.5																
SUM	3	16	18	12	18	18	21	12	9	16	4	1				148
TIME	74.0	50.4	17.6	16.1	14.4	18.3	17.2	19.2	14.1	7.1	1.2	.7	.1	0.0	0.0	250.6

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 1000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2		1					1									2
0.8																
0.7									1							1
0.6																
SUM		1					1		1							3
TIME	108.5	.4	.2	.4	.1	1.3	6.3	9.6	11.9	4.2	2.7	0.0	0.0	0.0	0.0	145.5

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6					1	1	2	1								5
1.5					1	1		1	1	2		1				7
1.4			2	2	1	4	2	1	1	3			1			17
1.3	2	8	3	4	8	5	3	3	2	2				1		41
1.2	4	18	17	15	16	10	18	7	11	9	3	2	1	1		132
0.8																
0.7	3	3	4	1	1	2	3	2	2	3	2		2			28
0.6								1		1						2
0.5																
SUM	9	29	26	22	28	23	28	16	17	20	5	3	4	2		232
TIME	259.7	111.2	47.3	45.1	40.3	35.5	38.1	40.2	32.3	13.2	5.2	2.9	1.3	.5	0.0	672.9

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 2000. MISSION SEGMENT ASCENT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.5																
1.4						1		1		1						3
1.3		2	2	3	1	1	1									10
1.2	5	17	9	9	8	6	9	5	3	1						72
0.8																
0.7	1	8	4	13	8	4	10	1	4							53
0.6		2			1	1										4
0.5					1											1
0.4																
SUM	6	29	15	25	19	13	20	7	7	2						143
TIME	66.3	155.5	115.4	118.3	125.0	104.5	101.7	56.6	36.0	9.9	1.6	.1	0.0	0.0	0.0	891.0

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 2000. MISSION SEGMENT MANUVR

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.6																
1.5									1							1
1.4					1					1						2
1.3							1	1								2
1.2					1	3	1	4	2	1	2					14
0.8																
0.7			1	2		1		1	3							8
0.6								1								1
0.5																
SUM			1	2	2	4	2	7	6	2	2					28
TIME	0.0	.4	2.3	2.3	.1	3.4	7.9	11.2	12.0	3.4	.2	0.0	0.0	0.0	0.0	47.2

TABLE XXIII - Continued

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 2000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6							1	2								3
1.5		1					1	1	1	1						5
1.4			1	1	1	2	2	2	3	2	1					15
1.3		2		1	2	6	6	3	7	5	2	1				35
1.2		7	8	5	5	13	15	16	15	11	3	2				100
0.8																
0.7	1	4	2	1	4	9	6	13	7	8	7					62
0.6		2					1	2	1	1						7
0.5																
SUM	1	16	11	8	12	30	32	39	34	28	13	3				227
TIME	35.3	42.8	18.8	23.1	33.7	69.5	102.5	138.8	137.4	90.0	22.1	3.1	1.0	.1	0.0	718.2

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 2000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.5																
1.4									1							1
1.3					1		4	1	2		1					9
1.2				1	6	4	13	10	9	15	1	2				61
0.8																
0.7					4	3	13	14	9	7	1					51
0.6					1		1			1						3
0.5																
SUM				1	12	7	31	25	21	23	3	2				125
TIME	91.4	6.4	7.1	18.9	44.0	136.0	396.8	770.8	712.5	353.0	67.9	6.9	.4	0.0	0.0	2612.1

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6							1	2								3
1.5		1					1	1	2	1						6
1.4			1	1	2	3	2	3	4	4	1					21
1.3		4	2	4	4	7	12	5	9	5	3	1				56
1.2	5	24	17	15	20	26	38	35	29	28	6	4				247
0.8																
0.7	2	12	7	16	16	17	29	29	23	15	8					174
0.6		4			2	1	2	3	1	2						15
0.5					1											1
0.4																
SUM	7	45	27	36	45	54	85	78	68	55	18	5				523
TIME	193.0	205.1	143.6	162.7	206.8	313.3	609.0	977.4	897.9	456.3	91.8	10.1	1.4	.1	0.0	4268.4

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 5000. MISSION SEGMENT DESCNT

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.3																
1.2									1							1
0.8																
0.7					1											1
0.6										1						1
0.5																
SUM					1				1	1						3
TIME	0.0	.4	.2	.2	.4	.6	2.0	6.6	10.8	4.0	.6	.1	.2	0.0	0.0	26.1

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000. ALTITUDE 5000. MISSION SEGMENT STEADY

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3								2								2
1.2																
0.8																
0.7					1		4	2			1					8
0.6																
0.5					1											1
0.4																
SUM					2		4	4			1					11
TIME	0.0	0.0	0.0	1.5	1.4	4.5	17.7	56.6	31.8	12.2	.5	0.0	0.0	0.0	0.0	126.2

TABLE XXIII - Concluded

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000+ ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.4																
1.3								2								2
1.2									1							1
0.8																
0.7					2		4	2			1					9
0.6										1						1
0.5					1											1
0.4																
SUM					3		4	4	1	1	1					14
TIME	.2	4.5	3.5	10.4	4.0	11.1	24.3	65.0	43.2	17.3	1.5	.1	.2	0.0	0.0	185.3

MANEUVER NZ PEAKS FOR VELOCITY VS NZ BY WEIGHT 8000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6					1	1	3	3								8
1.5		1			1	1	1	2	3	3		1				13
1.4			3	3	3	7	4	5	5	7	1		1			39
1.3	2	13	6	8	12	12	15	10	11	7	3	1		1		101
1.2	12	43	37	30	36	36	56	42	41	37	9	6	1	1		387
0.8																
0.7	5	15	11	17	19	19	36	33	25	18	11		2			211
0.6		4			2	1	2	4	1	4						18
0.5					2											2
0.4																
SUM	19	76	57	58	76	77	117	99	86	76	24	8	4	2		779
TIME	490.4	326.1	196.3	218.8	251.4	360.2	672.3	1091.0	975.8	487.0	98.6	13.0	2.8	.6	0.0	5184.3

MANEUVER NZ PEAKS FOR VELOCITY VS NZ

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
1.7																
1.6		1		2	2	1	4	4	5		1					20
1.5		2	1		2	3	2	4	7	3		2	1			27
1.4	2	6	4	7	11	19	16	15	7	11	3		1			102
1.3	4	39	19	22	24	27	39	28	24	17	8	4	1	2		258
1.2	32	107	63	80	97	108	135	121	101	88	30	18	3	2		985
0.8																
0.7	10	40	21	31	39	53	53	72	60	40	21	1	2			443
0.6	1	6	2	1	2	2	5	6	4	7	1					37
0.5				1	2	2	3		1		1					10
0.4						3	2		2							7
0.2							2	2								4
LESS						1										1
SUM	49	201	110	144	179	219	261	252	211	166	65	25	8	4		1894
TIME	1196.3	729.7	409.9	476.1	565.2	850.0	1585.9	2429.4	2403.7	1148.5	292.9	55.2	17.5	1.7	0.0	1[illegible]162.1

TABLE XXIV. n_x PEAKS FOR AIRSPEED VERSUS n_x BY WEIGHT

NX PEAKS FOR AIRSPEED VS NX BY WEIGHT 6000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	2															2
-0.20	4															4
-0.15	5	2														7
-0.10																
0.10	4	1		1			1	1								8
0.15	1															1
0.20																
0.25	1															1
0.30																
0.35																
0.40																
SUM	17	3		1			1	1								23
TIME	121.7	67.3	30.7	38.4	48.0	93.4	168.9	283.8	243.8	106.1	26.0	6.4	1.1	0.0	0.0	1215.7

NX PEAKS FOR AIRSPEED VS NX BY WEIGHT 7000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	1	1														2
-0.20	8	2														10
-0.15	17	9														26
-0.10																
0.10	6	2			2			2	3	3		1	2			21
0.15	1	1		1												3
0.20	1															1
0.25																
0.30																
0.35																
0.40																
SUM	34	15		1	2			2	3	3		1	2			63
TIME	544.1	336.3	182.9	219.0	265.8	396.4	744.7	1074.5	1184.1	555.4	168.3	35.8	13.6	1.1	0.0	5762.1

NX PEAKS FOR AIRSPEED VS NX BY WEIGHT 8000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	7															7
-0.20	10															10
-0.15	18	4	1	1	3	1			1		1					30
-0.10																
0.10	4	3		1		1				3	2					14
0.15	1			1												2
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	40	7	1	3	3	2			1	3	3					63
TIME	490.4	326.1	196.3	218.8	251.4	360.2	672.3	1091.0	975.8	487.0	98.6	13.0	2.8	.6	0.0	5184.3

TABLE XXV. n_x PEAKS FOR AIRSPEED VERSUS n_x BY ALTITUDE

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE LESS

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25																
-0.20																
-0.15																
-0.10																
0.10	4															4
0.15	1															1
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	5															5
TIME	67.9	10.7	2.6	.9	.4	.6	.2	.4	.6	5.2	4.3	0.0	0.0	0.0	0.0	93.7

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	8	1														9
-0.20	17															17
-0.15	29	7			2	1			1		1					41
-0.10																
0.10	8	5		1	2	1			1	3			1			22
0.15	2	1		2												5
0.20	1															1
0.25	1															1
0.30																
0.35																
0.40																
SUM	66	14		3	4	2			2	3	1		1			96
TIME	684.4	269.3	97.1	98.4	92.3	87.9	87.3	90.1	63.5	29.6	11.8	9.1	3.3	.6	0.0	1624.8

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	107	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	2															2
-0.20	4	1														5
-0.15	11	7	1	1	1											21
-0.10																
0.10	2	1		1			1	3	2	3	2	1	1			17
0.15																
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	19	9	1	2	1		1	3	2	3	2	1	1			45
TIME	443.8	63-.2	304.1	358.5	460.6	733.1	1423.7	2151.6	2222.0	1070.1	269.3	45.9	14.0	1.1	0.0	9932.0

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25																
-0.20	1															1
-0.15		1														1
-0.10																
0.10																
0.15																
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	1	1														2
TIME	.2	13.3	6.0	17.4	11.5	28.1	69.5	176.7	113.9	42.4	7.5	.1	.2	0.0	0.0	486.7

TABLE XXV - Concluded

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE 10000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25																
-0.20		1														1
-0.15																
-0.10																
0.10																
0.15																
0.20																
0.25																
0.30																
0.35																
0.40																
SUM		1														1
TIME	0.0	2.3	.1	.9	.5	.3	5.2	10.6	3.7	1.3	0.0	0.0	0.0	0.0	0.0	24.9

NX PEAKS FOR AIRSPEED VS NX BY ALTITUDE SUM

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	10	1														11
-0.20	22	2														24
-0.15	40	15	1	1	3	1			1		1					63
-0.10																
0.10	14	6		2	2	1	1	3	3	6	2	1	2			43
0.15	3	1		2												6
0.20	1															1
0.25	1															1
0.30																
0.35																
0.40																
SUM	91	25	1	5	5	2	1	3	4	6	3	1	2			149
TIME	1196.3	729.7	409.9	476.1	565.2	850.0	1585.9	2429.4	2403.7	1148.5	292.9	55.2	17.5	1.7	0.0	12162.1

TABLE XXVI. n_x PEAKS FOR LONGITUDINAL CYCLIC BOOST TUBE LOAD DEFLECTION VERSUS n_x BY MISSION SEGMENT

NX PEAKS FOR CY-LNG DFLECTN VS NX BY MISS. SEG. ASCENT

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100					8	5	11		4							28
100					1	3	6		3							13
150					1	1	10		5	1						18
200						2	10									12
250																
300									1	1						2
350																
400																
450																
SUM					10	11	37		13	2						73

TABLE XXVI - Concluded

NX PEAKS FOR CY-LNG DFLECTN VS NX BY MISS. SEG. MANUVR

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100																
100																
150							1									1
200																
250																
300																
350									1							1
400																
450																
SUM							1		1							2

NX PEAKS FOR CY-LNG DFLECTN VS NX BY MISS. SEG. DESCNT

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200												1				1
-150																
-100						7	9		5							21
100						3	5		5		1					14
150						1	5		7	2						15
200							2		4	2						8
250							1		1							2
300									2							2
350																
400																
450																
SUM						11	22		24	4	1	1				63

NX PEAKS FOR CY-LNG DFLECTN VS NX BY MISS. SEG. STEADY

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100					1	2	3		5							11
100																
150																
200																
250																
300																
350																
400																
450																
SUM					1	2	3		5							11

NX PEAKS FOR CY-LNG DFLECTN VS NX BY MISS. SEG. SUM

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200												1				1
-150																
-100					9	14	23		14							60
100					1	6	11		8		1					27
150					1	2	16		12	3						34
200						2	12		4	2						20
250							1		1							2
300									3	1						4
350									1							1
400																
450																
SUM					11	24	63		43	6	1	1				149

TABLE XXVII. n_y PEAKS FOR AIRSPEED VERSUS n_y BY WEIGHT

NY PEAKS FOR AIRSPEED VS NY BY WEIGHT 6000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25																
-0.20	1															1
-0.15	6	1		1	1	2	1				1					13
-0.10																
0.10	10	3			1			2								16
0.15																
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	17	4		1	2	2	1	2			1					30
TIME	121.7	67.3	30.7	38.4	48.0	93.4	168.9	283.8	243.8	106.1	26.0	6.4	1.1	0.0	0.0	1219.7

NY PEAKS FOR AIRSPEED VS NY BY WEIGHT 7000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30									1							1
-0.25	1															2
-0.20	1	1	1			1			1							5
-0.15	7	4		1	2	4	2		4		2	3	5	1		35
-0.10																
0.10	16	1			1		2	1	1	2	1	1	1			27
0.15	4					1				1						6
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	29	6	1	1	3	6	5	1	7	3	3	4	6	1		76
TIME	584.1	336.3	182.9	219.0	265.8	396.4	744.7	1074.5	1184.1	555.4	168.3	35.8	13.6	1.1	0.0	5762.1

NY PEAKS FOR AIRSPEED VS NY BY WEIGHT 8000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25					1					1						2
-0.20																
-0.15	9	1			1	2	2	4	2		2	4	4	1		32
-0.10																
0.10	17	1	1	3		2	4	7	2	2						39
0.15	2															2
0.20																
0.25									1							1
0.30																
0.35																
0.40																
SUM	28	2	1	3	2	4	6	11	5	3	2	4	4	1		76
TIME	490.4	326.1	196.3	218.8	251.4	360.2	672.3	1091.0	975.8	487.0	98.6	13.0	2.8	.6	0.0	5184.3

TABLE XXVIII. n_y PEAKS FOR AIRSPEED VERSUS n_y BY ALTITUDE

NY PEAKS FOR AIRSPEED VS NY BY ALTITUDE LESS

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25	1															1
-0.20																
-0.15									1							1
-0.10																
0.10	6		1													7
0.15	1															1
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	8		1						1							10
TIME	67.9	10.7	2.6	.9	.4	.6	.2	.4	.6	5.2	4.3	0.0	0.0	0.0	0.0	93.7

NY PEAKS FOR AIRSPEED VS NY BY ALTITUDE 1000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25					1											1
-0.20	2	1	1						1							5
-0.15	15	3		2	3	6		4	1		4	7	7	2		54
-0.10																
0.10	28	3		1	1	1	2	2	1	3	1		1			44
0.15	5															5
0.20																
0.25																
0.30																
0.35																
0.40																
SUM	50	7	1	3	5	7	2	6	3	3	5	7	8	2		109
TIME	484.4	269.3	97.1	98.4	92.3	87.9	87.3	90.1	63.5	29.6	11.8	9.1	3.3	.6	0.0	1624.8

NY PEAKS FOR AIRSPEED VS NY BY ALTITUDE 2000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30									1							1
-0.25							1			1						2
-0.20						1										1
-0.15	7	3				2	5		4		1		2			24
-0.10																
0.10	9	2		2	1	1	1	4	2	1		1				24
0.15						1				1						2
0.20																
0.25									1							1
0.30																
0.35																
0.40																
SUM	16	5		2	1	5	7	4	8	3	1	1	2			55
TIME	443.8	434.2	304.1	358.5	460.6	733.1	1423.7	2151.6	2222.0	1070.1	269.3	45.9	14.0	1.1	0.0	9932.0

NY PEAKS FOR AIRSPEED VS NY BY ALTITUDE 5000

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25																
-0.20																
-0.15					1											1
-0.10																
0.10							3	4								7
0.15																
0.20																
0.25																
0.30																
0.35																
0.40																
SUM					1		3	4								8
TIME	.2	13.3	6.0	17.4	11.5	28.1	69.5	176.7	113.9	42.4	7.5	.1	.2	0.0	0.0	486.7

TABLE XXVIII - Concluded

NY PEAKS FOR AIRSPEED VS NY BY ALTITUDE SUM

	LESS	40	60	65	70	75	80	85	90	95	100	105	110	115	120	SUM
LESS																
-0.40																
-0.35																
-0.30									1							1
-0.25	1				1		1			1						4
-0.20	2	1	1			1			1							6
-0.15	22	6		2	4	8	5	4	6		5	7	9	2		80
-0.10																
0.10	43	5	1	3	2	2	6	10	3	4	1	1	1			82
0.15	6					1				1						8
0.20																
0.25									1							1
0.30																
0.35																
0.40																
SUM	74	12	2	5	7	12	12	14	12	6	6	8	10	2		182
TIME	1196.3	729.7	409.9	476.1	565.2	850.0	1585.9	2429.4	2403.7	1148.5	292.0	55.2	17.5	1.7	0.0	12162.1

TABLE XXIX. n_y PEAKS FOR LATERAL CYCLIC BOOST TUBE LOAD DEFLECTION VERSUS n_y BY MISSION SEGMENT

NY PEAKS FOR CY-LAT DFLECTN VS NY BY MISS. SEG. ASCENT

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150							1		1							2
-100					1	1	25		32	1		1				61
100							2		2							4
150									3							3
200																
250																
300																
350																
400																
450																
SUM					1	1	28		38	1		1				70

NY PEAKS FOR CY-LAT DFLECTN VS NY BY MISS. SEG. MANUVR

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100					1		17		2	1						21
100																
150																
200																
250																
300																
350																
400																
450																
SUM					1		17		2	1						21

TABLE XXIX - Concluded

NY PEAKS FOR CY-LAT DFLECTN VS NY BY MISS. SEG. DESCNT

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250							1									1
-200																
-150					1	1			1							3
-100					1	4	25		22	2						54
100							2									2
150							1		1							2
200																
250																
300																
350																
400																
450																
SUM					2	5	29		24	2						62

NY PEAKS FOR CY-LAT DFLECTN VS NY BY MISS. SEG. STEADY

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250																
-200																
-150																
-100				1			6		18	4						29
100																
150																
200																
250																
300																
350																
400																
450																
SUM				1			6		18	4						29

NY PEAKS FOR CY-LAT DFLECTN VS NY BY MISS. SEG. SUM

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-450																
-400																
-350																
-300																
-250							1									1
-200																
-150					1	1	1		2							5
-100				1	3	5	73		74	8		1				165
100							4		2							6
150							1		4							5
200																
250																
300																
350																
400																
450																
SUM				1	4	6	80		82	8		1				182

TABLE XXX. n_x PEAKS FOR n_x VERSUS n_z

NX PEAKS FOR NX VS NZ

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6																
1.5					1											1
1.4									3							3
1.3									2							2
1.2									4	1		1				6
0.8					10	23	63		34	5	1					136
0.7						1										1
0.6																
0.5																
0.4																
0.2																
LESS																
SUM					11	24	63		43	6	1	1				149

TABLE XXXI. n_x PEAKS FOR n_y VERSUS n_x

NX PEAKS FOR NY VS NX

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-0.40																
-0.35																
-0.30																
-0.25							1	10								11
-0.20							1	23								24
-0.15								63								63
-0.10																
0.10						1		41	1							43
0.15								6								6
0.20								1								1
0.25								1								1
0.30																
0.35																
0.40																
SUM						1	2	145	1							149

TABLE XXXII. n_y PEAKS FOR n_x VERSUS n_y

NY PEAKS FOR NX VS NY

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
LESS																
-0.40																
-0.35																
-0.30								1								1
-0.25								3	1							4
-0.20								6								6
-0.15						1	10	68	1							80
-0.10																
0.10							3	58	15	5	1					82
0.15						2		5	1							8
0.20																
0.25								1								1
0.30																
0.35																
0.40																
SUM						3	13	142	18	5	1					182

TABLE XXXIII. n_y PEAKS FOR n_y VERSUS n_z

NY PEAKS FOR NY VS NZ

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6																
1.5							2		2							4
1.4																
1.3							1		1							2
1.2						1	7		3							11
0.8				1	4	5	70		75	8		1				164
0.7									1							1
0.6																
0.5																
0.4																
0.2																
LESS																
SUM				1	4	6	80		82	8		1				182

TABLE XXXIV. n_z PEAKS FOR n_x VERSUS n_z

NZ MANEUVER PEAKS FOR NX VS NZ

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6								20								20
1.5					1			26								27
1.4								100	2							102
1.3							5	248	4	1						258
1.2						2	16	939	23	4		1				985
0.8																
0.7							7	436								443
0.6							1	36								37
0.5								10								10
0.4								7								7
0.2								4								4
LESS								1								1
SUM					1	2	29	1827	29	5		1				1894

TABLE XXXV. n_z PEAKS FOR n_y VERSUS n_z

NZ MANEUVER PEAKS FOR NY VS NZ

	LESS	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6								20								20
1.5							1	26								27
1.4								102								102
1.3							2	256								258
1.2							3	982								985
0.8																
0.7							2	441								443
0.6								37								37
0.5								10								10
0.4								7								7
0.2								4								4
LESS								1								1
SUM							8	1886								1894

TABLE XXXVI. n_{ze} PEAKS FOR μ VERSUS n_{ze} BY ALTITUDE AND MISSION SEGMENT

NZE PEAKS FOR MU VS NZE BY ALT LESS MIS-SEG ASCENT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8				1						1
1.7			2							2
1.6		1	1							2
1.5		4	2							6
1.4		4		1	1					6
1.3		3		1						4
1.2										
0.8										
0.7										
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		12	5	3	1					21
TIME	0.0	18.4	6.0	1.0	.6	0.0	0.0	0.0	0.0	26.0

NZE PEAKS FOR MU VS NZE BY ALT 1000 MIS-SEG ASCENT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2				1						1
2.0					1					1
1.8		2	3	2	2					9
1.7		1	8	3	1					13
1.6		6	13	10						29
1.5		1	24	20	2					47
1.4		14	24	16	6					60
1.3		11	23	11						45
1.2		7	7	2						16
0.8										
0.7		1	1	1						3
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		43	103	66	12					224
TIME	0.0	221.8	221.9	122.9	8.2	0.0	0.0	0.0	0.0	574.8

TABLE XXXVI - Continued

NZE PEAKS FOR MU VS NZE BY ALT 2000 MIS-SEG ASCENT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0				1						1
1.8			2	4						6
1.7		2	10	10						22
1.6		3	16	25	1					45
1.5		4	30	30						64
1.4		9	45	29	1					84
1.3		4	28	32	5					69
1.2		7	8	16						31
0.8										
0.7			7	11	1					19
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		29	146	158	8					341
TIME	0.0	206.0	826.7	843.9	39.0	0.0	0.0	0.0	0.0	1915.5

NZE PEAKS FOR MU VS NZE BY ALT 1000 MIS-SEG MANUVR

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7										
1.6					2					2
1.5					3					3
1.4			1	3	9					13
1.3					2					2
1.2										
0.8										
0.7					1					1
0.6										
0.5										
0.4										
0.2										
LESS										
SUM			1	3	17					21
TIME	0.0	.4	.4	3.3	16.0	0.0	0.0	0.0	0.0	20.1

TABLE XXXVI - Continued

NZE PEAKS FOR MU VS NZE BY ALT 2000 MIS-SEG MANUVR

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8				1						1
1.7				1	2					3
1.6				5						5
1.5			1	14	4					19
1.4			3	13	2					18
1.3			3	18	3					24
1.2				10						10
0.8										
0.7			1	3						4
0.6				2						2
0.5										
0.4						1				1
0.2										
LESS				1						1
SUM			8	68	11	1				88
TIME	0.0	.9	15.2	89.4	8.4	.1	0.0	0.0	0.0	114.1

NZE PEAKS FOR MU VS NZE BY ALT LESS MIS-SEG DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7										
1.6			1							1
1.5		1	1							2
1.4		1		1						2
1.3		1								1
1.2										
0.8										
0.7										
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		3	2	1						6
TIME	0.0	20.6	4.4	.6	.0	0.0	0.0	0.0	0.0	25.6

TABLE XXXVI - Continued

NZE PEAKS FOR MU VS NZE BY ALT 1000 MIS-SEG DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2				1						1
2.0			1	2						3
1.8			6	18	2					26
1.7			8	18	2					28
1.6		4	26	27	7					64
1.5		4	30	51	5					90
1.4		4	33	40	5					82
1.3		4	24	25						53
1.2		1	9	6	2					18
0.8										
0.7			1	1						2
0.6										
0.5				1						1
0.4										
0.2										
LESS										
SUM		17	138	190	23					368
TIME	0.0	247.6	182.8	202.6	14.4	0.0	0.0	0.0	0.0	647.5

NZE PEAKS FOR MU VS NZE BY ALT 2000 MIS-SEG DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2				1						1
2.0				4	2					6
1.8			6	19	3					28
1.7		2	4	21	6					33
1.6		1	15	48	15					79
1.5			21	83	18					122
1.4		3	22	130	31					186
1.3		4	33	105	20					162
1.2		5	11	54	7					77
0.8										
0.7			2	7	3					12
0.6			1	3	2					6
0.5			1	5						6
0.4				4						4
0.2				5						5
LESS										
SUM		15	116	489	107					727
TIME	0.0	123.5	229.0	1262.7	239.7	0.0	0.0	0.0	0.0	1855.0

TABLE XXXVI - Continued

NZE PEAKS FOR MU VS NZE BY ALT 5000 MIS-SEG DESCNT

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7										
1.6										
1.5				1						1
1.4			1	1						2
1.3				1						1
1.2										
0.8										
0.7										
0.6										
0.5										
0.4										
0.2										
LESS										
SUM			1	3						4
TIME	0.0	0.0	2.1	52.6	9.2	0.0	0.0	0.0	0.0	63.9

NZE PEAKS FOR MU VS NZE BY ALT LESS MIS-SEG STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7										
1.6										
1.5										
1.4		1			1					2
1.3					1					1
1.2										
0.8										
0.7										
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		1			2					3
TIME	0.0	33.0	0.0	1.1	8.0	0.0	0.0	0.0	0.0	42.1

TABLE XXXVI - Continued

NZE PEAKS FOR MU VS NZE BY ALT 1000 MIS-SEG STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7				1						1
1.6										
1.5		1		1						2
1.4				1	1					2
1.3					2					2
1.2				1	1					2
0.8										
0.7										
0.6										
0.5										
0.4										
0.2										
LESS										
SUM		1		4	4					9
TIME	0.0	303.5	1.8	66.8	10.3	0.0	0.0	0.0	0.0	382.5

NZE PEAKS FOR MU VS NZE BY ALT 2000 MIS-SEG STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8				3						3
1.7			2	6	2					10
1.6			2	20	6					28
1.5			4	64	22					90
1.4			9	126	45					180
1.3			2	83	38					123
1.2				38	8					46
0.8										
0.7				7	2					9
0.6										
0.5										
0.4										
0.2										
LESS										
SUM			19	347	123					489
TIME	0.0	204.8	116.2	4875.7	850.7	0.0	0.0	0.0	0.0	6047.4

TABLE XXXVI - Concluded

NZE PEAKS FOR MU VS NZE BY ALT 5000 MIS-SEG STEADY

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2										
2.0										
1.8										
1.7				1						1
1.6				1						1
1.5				2	1					3
1.4				1						1
1.3										
1.2										
0.8										
0.7			1							1
0.6										
0.5										
0.4										
0.2										
LESS										
SUM			1	5	1					7
TIME	0.0	0.0	3.7	319.5	30.0	0.0	0.0	0.0	0.0	353.2

NZE PEAKS FOR MU VS NZE SUM

	LESS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	SUM
2.4										
2.2				3						3
2.0			1	7	3					11
1.8		2	17	48	7					74
1.7		5	34	61	13					113
1.6		15	74	136	31					256
1.5		15	113	266	55					449
1.4		36	138	362	102					638
1.3		27	113	276	71					487
1.2		20	35	127	18					200
0.8										
0.7		1	13	30	7					51
0.6			1	5	2					8
0.5			1	6						7
0.4				4		1				5
0.2				5						5
LESS				1						1
SUM		121	540	1337	309	1				2308
TIME	0.0	1383.0	1644.4	7896.7	1237.9	.1	0.0	0.0	0.0	12162.1

TABLE XXXVII. n_{z_e} PEAKS FOR AIRSPEED VERSUS n_{z_e} BY ALTITUDE AND MISSION SEGMENT

NZE PEAKS FOR VEL VS NZE BY ALT LESS MIS-SEG ASCENT

	LESS	40	60	70	75	80	89	90	95	100	105	110	119	120	124	SUM
2.4																
2.2																
2.0																
1.8								1								1
1.7		1	1													2
1.6	1		1													2
1.5	4		2													6
1.4	3	1				1					1					6
1.3	3							1								4
1.2																
0.8																
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM	11	2	4			1		2			1					21
TIME	16.3	5.5	1.8	.7	.2	.3	.2	.2	.3	.3	.2	0.0	0.0	0.0	0.0	26.0

NZE PEAKS FOR VEL VS NZE BY ALT LESS MIS-SEG DESCNT

	LESS	40	60	70	75	80	85	90	95	100	105	110	119	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6		1														1
1.5		1		1												2
1.4	1					1										2
1.3	1															1
1.2																
0.8																
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM	2	2		1		1										6
TIME	18.7	5.2	.8	.2	.2	.3	0.0	.2	.0	0.0	.0	0.0	0.0	0.0	0.0	2[illegible].6

NZE PEAKS FOR VEL VS NZE BY ALT LESS MIS-SEG STEADY

	LESS	40	60	70	75	80	85	90	95	100	105	110	119	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6																
1.5																
1.4	1									1						2
1.3											1					1
1.2																
0.8																
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM	1									1	1					3
TIME	33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.3	4.8	4.1	0.0	0.0	0.0	0.0	42.1

TABLE XXXVII - Continued

NZE PEAKS FOR VEL VS NZE BY ALT 1000 MIS-SEG ASCENT

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2					1											1
2.0												1				1
1.8	1	3	1			1			1	2						9
1.7	1	2		6	1	1			1				1			13
1.6	3	7	3	5	2	2	3	2	2							29
1.5		11	4	7	11	4	7	1		2						47
1.4	10	17	3	6	5	3	4	3	3	4		1		1		60
1.3	9	16	3	4	3	6	3			1						45
1.2	5	6		2	2			1								16
0.8																
0.7	1	1					1									3
0.6																
0.5																
0.4																
0.2																
LESS																
SUM	30	63	14	30	25	17	18	7	7	9		2	1	1		224
TIME	184.7	130.7	54.3	58.0	49.9	34.8	26.1	18.0	9.2	4.6	1.7	2.1	.5	.0	0.0	574.8

NZE PEAKS FOR VEL VS NZE BY ALT 1000 MIS-SEG MANUVR

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7												1		1		2
1.6											1		1	1		3
1.5			1					2	1	1	1	3	2	2		13
1.4												2				2
1.3																
1.2																
0.8											1					1
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM			1					2	1	1	3	6	3	4		21
TIME	0.0	.5	.2	.1	.1	.1	.7	1.6	.7	4.1	4.1	[illegible].3	2.1	.5	0.0	20.1

NZE PEAKS FOR VEL VS NZE BY ALT 1000 MIS-SEG DESCNT

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2								1								1
2.0			1			1	1									3
1.8			3	1	7	3	3	3	3	3						26
1.7		3	2	2	5	5	3	4		2	1	1				28
1.6	1	11	7	9	5	8	6	6	3	5	1		1	1		64
1.5	3	12	6	10	7	10	14	10	11	5	2					90
1.4	2	14	6	9	12	13	5	7	9	3	1	1				82
1.3	2	12	4	6	6	13	6	4								53
1.2		3	2	2	4	2	3			2						18
0.8																
0.7			1					1								2
0.6																
0.5									1							1
0.4																
0.2																
LESS																
SUM	8	55	32	39	46	55	41	36	27	20	5	2	1	1		368
TIME	196.7	137.1	42.2	39.9	41.3	49.2	47.3	43.1	31.6	13.8	3.1	1.4	.7	.0	0.0	647.5

TABLE XXXVII - Continued

NZE PEAKS FOR VEL VS NZE BY ALT 1000 MIS-SEG STEADY

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7							1									1
1.6																
1.5		1				1										2
1.4									1	1						2
1.3										2						2
1.2									1		1					2
0.8																
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM		1				1	1		2	3	1					9
TIME	302.9	1.0	.5	.4	1.0	3.8	13.2	27.4	22.0	7.1	2.9	.2	0.0	0.0	0.0	382.5

NZE PEAKS FOR VEL VS NZE BY ALT 2000 MIS-SEG ASCENT

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0										1						1
1.8		1	1			1	1	1	1							6
1.7	1	7	3	1	3	1	2	3		1						22
1.6	2	7	2	7	6	11	7	1	1			1				45
1.5	4	9	10	8	8	9	9	3	4							64
1.4	4	22	13	11	13	6	5	5	3	2						84
1.3	1	8	9	11	5	5	7	13	4	4	1		1			69
1.2	5	6	1	2	2	5	3	4	3							31
0.8																
0.7		1	1	3	4	5	2	2			1					19
0.6																
0.5																
0.4																
0.2																
LESS																
SUM	17	61	40	43	41	43	36	32	16	8	2	1	1			341
TIME	145.8	314.7	230.1	244.0	256.4	227.3	211.4	151.3	89.0	33.1	10.2	1.9	.2	0.0	0.0	1915.5

NZE PEAKS FOR VEL VS NZE BY ALT 2000 MIS-SEG MANUVR

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8									1							1
1.7					1					1		1				3
1.6						1	2	1	1							5
1.5				1	1	3	1	5	3	2	3					19
1.4		1		2		3	2	3	5	1	1					18
1.3			2	1	1	1	8	4	3	2		2				24
1.2					3	3	2	2								10
0.8																
0.7		1			1			1	1							4
0.6					1		1									2
0.5																
0.4									1							1
0.2																
LESS						1										1
SUM		2	2	4	8	12	16	16	15	6	4	3				88
TIME	0.0	2.5	3.4	6.1	10.2	12.4	18.1	26.3	24.1	8.6	2.0	.4	0.0	0.0	0.0	114.1

TABLE XXXVII - Continued

NZE PEAKS FOR VEL VS NZE BY ALT 2000 MIS-SEG DESCNT

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2							1									1
2.0							1	3		1	1					6
1.8		1	1	1	4	4	4	3	6	3	1					28
1.7		4	2			4	3	6	7	2	3	1	1			33
1.6		5	2	6	5	7	15	9	13	14	2	1				79
1.5		3	4	11	8	17	22	18	21	9	7	2				122
1.4	2	4	3	10	19	20	23	37	34	20	12	1	1			186
1.3	1	11	6	10	21	23	19	22	26	11	6	5	1			162
1.2		9	2	2	6	10	20	12	7	4	2	3				77
0.8																
0.7		1		1		2		4		4						12
0.6				1				2	1	1	1					6
0.5				1		2	3									6
0.4						3	1									4
0.2							3	2								5
LESS																
SUM	3	38	20	43	63	92	115	118	115	69	35	13	3			727
TIME	95.5	98.9	50.5	63.2	95.0	171.1	282.1	368.9	332.[illegible]	204.4	69.1	18.1	4.4	.8	0.0	1855.0

NZE PEAKS FOR VEL VS NZE BY ALT 2000 MIS-SEG STEADY

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8							3									3
1.7					2		4		2	1	1					10
1.6				1	2	1	3	11	3	7						28
1.5				2	4	6	16	16	18	19	6	2	1			90
1.4			1	5	10	6	30	39	39	36	11	2	1			180
1.3		1	1		1	11	10	29	27	25	13	5				123
1.2							7	17	12	7	3					46
0.8																
0.7					1			3	3		1	1				9
0.6																
0.5																
0.4																
0.2																
LESS																
SUM		1	2	8	20	24	73	115	104	95	35	10	2			489
TIME	202.5	18.1	20.0	[illegible].3	98.9	322.3	912.1	1605.1	1775.9	823.9	188.0	25.5	9.5	.3	0.0	6047.4

NZE PEAKS FOR VEL VS NZE BY ALT 5000 MIS-SEG DESCNT

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7																
1.6									1							1
1.5			1		1											2
1.4								1								1
1.3																
1.2																
0.8																
0.7																
0.6																
0.5																
0.4																
0.2																
LESS																
SUM			1		1			1	1							4
TIME	[illegible]	.4	.5	1.0	1.9	3.8	9.1	15.4	20.9	9.9	.9	.1	.2	0.0	0.0	63.9

TABLE XXXVII - Concluded

NZE PEAKS FOR VEL VS NZE BY ALT 5000 MIS-SEG STEADY

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2																
2.0																
1.8																
1.7								1								1
1.6								1								1
1.5						1	1				1					3
1.4							1									1
1.3																
1.2																
0.8																
0.7					1											1
0.6																
0.5																
0.4																
0.2																
LESS																
SUM					1	1	2	2			1					7
TIME	0.0	.3	.3	2.0	2.2	13.8	51.5	153.9	91.9	31.1	6.2	.0	0.0	0.0	0.0	353.2

NZE PEAKS FOR VEL VS NZE SUM

	LESS	40	60	70	75	80	85	90	95	100	105	110	115	120	124	SUM
2.4																
2.2					1		1	1								3
2.0			1			1	2	3		2	1	1				11
1.8	1	5	6	2	11	9	11	8	12	8	1					74
1.7	2	17	8	9	12	11	13	14	10	7	5	3	2			113
1.6	7	31	15	28	20	30	36	31	23	26	3	3	1	2		256
1.5	11	37	26	40	39	51	70	53	58	37	20	4	2	1		449
1.4	23	59	28	43	60	53	70	96	95	69	27	8	4	3		638
1.3	17	48	25	32	37	59	53	74	60	45	21	14	2			487
1.2	10	24	5	8	17	20	35	36	23	13	6	3				200
0.8																
0.7	1	4	2	4	7	7	3	11	4	4	3	1				51
0.6				1	1		1	2	1	1	1					8
0.5				1		2	3		1							7
0.4						3	1		1							5
0.2							3	2								5
LESS						1										1
SUM	72	225	116	168	205	247	302	331	288	212	88	37	11	6		2308
TIME	1196.3	729.7	409.9	476.1	565.2	850.0	1585.9	2429.4	2403.7	1148.5	292.9	55.2	17.5	1.7		C.012162.1

TABLE XXXVIII. VIBRATORY AND MEAN BOOST TUBE CONTROL LOADS FOR REPRESENTATIVE FLIGHT CONDITIONS

Flight Condition	A/S kn	N_R rpm	GW lb	Lateral			Longitudinal			Collective		
				1/Rev ±lb	2/Rev ±lb	Mean lb	1/Rev ±lb	2/Rev ±lb	Mean lb	1/Rev ±lb	2/Rev ±lb	Mean lb
Autorotation	80	322	6450	282	188	-29	213	128	48	164	--	-157
	83	325	6402	282	106	-6	170	85	37	109	38	-266
	81	325	6364	117	75	-41	106	64	37	55	--	-266
	0	280	6805	200	94	-76	149	85	-91	53	--	-394
	85	321	6305	188	94	-76	128	64	59	120	53	-194
	78	323	6263	164	71	18	170	106	-5	160	54	87
Descent	89	326	7332	131	59	-111	141	22	228	54	27	93
	88	321	7201	119	47	-123	108	43	207	27	--	80
Des/Flare	78	320	7328	119	36	-100	152	87	80	40	--	-27
Hover	0	322	7322	142	95	-53	97	65	-16	27	--	-80
	0	322	8785	95	--	-100	65	--	-5	13	--	-67
Ascent	60	326	9275	119	47	-76	108	11	197	27	--	-80
	73	324	8771	142	59	-147	130	43	228	54	27	-27
Maneuver	87	319	6917	166	118	-182	130	22	276	108	--	410
	65	320	7259	119	71	-170	216	108	410	108	54	120
Descent	50	327	8981	440	95	-182	260	87	101	54	27	348
Cruise	91	326	9258	107	24	-65	130	43	239	27	--	-67
	97	318	8346	98	0	-12	129	79	165	124	--	0